

Supporting Information for

Improving Science Education and Understanding with Wikipedia

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Panel Survey

Introduction:

There are two basic ways to collect survey data on student learning. The first is to gather data before, during and after a class (or project) and look for changes as they occur. Another way is to collect data retrospectively, by having students reflect on their experiences, putting the various events of the term into perspective. In this latter case, it is better to have students work in groups because the “collective memory of shared experience” is more reliable than that of an individual.

The following questions ask about your experience with Chem 540, and how the 7 main class features figure into your self-assessment of their effect on a variety of learning goals.

You should break into groups of 5 students and then discuss and create a consensus choice for what your collective answer to the following questions will be. Everyone should participate and use as much evidence-based reasoning as possible in your conversations. That is, rather than “I think the best reply is 6” you should buttress your argument with reasons: “I think that the best reply is 6, because [and then describe a specific event from class, or homework, or a project, that backs your position].” In the case of significant disagreements, you will need to come to a consensus that best represents the group.

1A. The first learning goal for Chem 540 was to explore and learn advanced concepts in organic chemistry. To what degree do you think that each of the following contributed to this goal?

	extremely		significantly	neutral	not significantly	not at all	
(a) classroom lecture	7	6	5	4	3	2	1
(b) textbook	7	6	5	4	3	2	1
(c) problem sets	7	6	5	4	3	2	1
(d) literature papers	7	6	5	4	3	2	1
(e) wikipedia project	7	6	5	4	3	2	1
(f) studying alone	7	6	5	4	3	2	1
(g) studying with others	7	6	5	4	3	2	1

1B. Now, rank these seven according to their significance in getting you to explore and learn advanced concepts in organic chemistry.

	RANK (1 = most significant; 7 = least significant; no ties allowed!)						
(a) classroom lecture	1	2	3	4	5	6	7
(b) textbook	1	2	3	4	5	6	7
(c) problem sets	1	2	3	4	5	6	7
(d) literature papers	1	2	3	4	5	6	7
(e) wikipedia project	1	2	3	4	5	6	7
(f) studying alone	1	2	3	4	5	6	7
(g) studying with others	1	2	3	4	5	6	7

2A. The second learning goal for Chem 540 was to learn to communicate science to a diverse and general audience. To what degree do you think that each of the following contributed to this goal?

	extremely		significantly	neutral	not significantly	not at all	
(a) classroom lecture	7	6	5	4	3	2	1
(b) textbook	7	6	5	4	3	2	1
(c) problem sets	7	6	5	4	3	2	1
(d) literature papers	7	6	5	4	3	2	1
(e) wikipedia project	7	6	5	4	3	2	1
(f) studying alone	7	6	5	4	3	2	1
(g) studying with others	7	6	5	4	3	2	1

2B. Now, rank these seven according to their significance in getting you to communicate science to a diverse and general audience.

	RANK (1 = most significant; 7 = least significant; no ties allowed!)						
(a) classroom lecture	1	2	3	4	5	6	7
(b) textbook	1	2	3	4	5	6	7
(c) problem sets	1	2	3	4	5	6	7
(d) literature papers	1	2	3	4	5	6	7
(e) wikipedia project	1	2	3	4	5	6	7
(f) studying alone	1	2	3	4	5	6	7
(g) studying with others	1	2	3	4	5	6	7

3A. The third learning goal for Chem 540 was to learn to identify appropriate references and other resources in order to build an argument. To what degree do you think that each of the following contributed to this goal?

	extremely	significantly	neutral	not significantly	not at all		
(a) classroom lecture	7	6	5	4	3	2	1
(b) textbook	7	6	5	4	3	2	1
(c) problem sets	7	6	5	4	3	2	1
(d) literature papers	7	6	5	4	3	2	1
(e) wikipedia project	7	6	5	4	3	2	1
(f) studying alone	7	6	5	4	3	2	1
(g) studying with others	7	6	5	4	3	2	1

3B. Now, rank these seven according to their significance in getting you to identify appropriate references and other resources in order to build an argument.

	RANK (1 = most significant; 7 = least significant; no ties allowed!)						
(a) classroom lecture	1	2	3	4	5	6	7
(b) textbook	1	2	3	4	5	6	7
(c) problem sets	1	2	3	4	5	6	7
(d) literature papers	1	2	3	4	5	6	7
(e) wikipedia project	1	2	3	4	5	6	7
(f) studying alone	1	2	3	4	5	6	7
(g) studying with others	1	2	3	4	5	6	7

4A. The fourth learning goal for Chem 540 was to learn to work collaboratively. To what degree do you think that each of the following contributed to this goal?

	extremely	significantly	neutral	not significantly	not at all		
(a) classroom lecture	7	6	5	4	3	2	1
(b) textbook	7	6	5	4	3	2	1
(c) problem sets	7	6	5	4	3	2	1
(d) literature papers	7	6	5	4	3	2	1
(e) wikipedia project	7	6	5	4	3	2	1
(f) studying alone	7	6	5	4	3	2	1
(g) studying with others	7	6	5	4	3	2	1

4B. Now, rank these seven according to their significance in getting you to learn to work collaboratively.

	RANK (1 = most significant; 7 = least significant; no ties allowed!)						
(a) classroom lecture	1	2	3	4	5	6	7
(b) textbook	1	2	3	4	5	6	7
(c) problem sets	1	2	3	4	5	6	7
(d) literature papers	1	2	3	4	5	6	7
(e) wikipedia project	1	2	3	4	5	6	7
(f) studying alone	1	2	3	4	5	6	7
(g) studying with others	1	2	3	4	5	6	7

5A. The fifth learning goal for Chem 540 was to learn to understand how a well-researched explanation is constructed. To what degree do you think that each of the following contributed to this goal?

	extremely		significantly	neutral	not significantly	not at all	
(a) classroom lecture	7	6	5	4	3	2	1
(b) textbook	7	6	5	4	3	2	1
(c) problem sets	7	6	5	4	3	2	1
(d) literature papers	7	6	5	4	3	2	1
(e) wikipedia project	7	6	5	4	3	2	1
(f) studying alone	7	6	5	4	3	2	1
(g) studying with others	7	6	5	4	3	2	1

5B. Now, rank these seven according to their significance in getting you to understand how a well-researched explanation is constructed.

	RANK (1 = most significant; 7 = least significant; no ties allowed!)						
(a) classroom lecture	1	2	3	4	5	6	7
(b) textbook	1	2	3	4	5	6	7
(c) problem sets	1	2	3	4	5	6	7
(d) literature papers	1	2	3	4	5	6	7
(e) wikipedia project	1	2	3	4	5	6	7
(f) studying alone	1	2	3	4	5	6	7
(g) studying with others	1	2	3	4	5	6	7

6. OPEN-ENDED QUESTIONS

You do not need to come to consensus about these. Just make a list.

A. Based on your experience, are there other things that you think should be included among the learning goals of Chem 540?

B. Based on your experience, are there other things that should be included among the class resources that contribute to the learning in Chem 540?

Full Version of Figure 1

http://en.wikipedia.org/w/index.php?title=Fire-safe_polymers&oldid=284068349

The screenshot shows the Wikipedia article for "Fire-safe polymers". At the top, there is a navigation bar with tabs for "article", "discussion", "edit this page", and "history". Below this is the Wikipedia logo and the text "Wikipedia Forever Our shared knowledge. Our shared treasure. Help us protect it." The article title "Fire-safe polymers" is prominently displayed, followed by the text "From Wikipedia, the free encyclopedia". A red banner indicates that this is an old revision of the page, edited by Chem538grp3w09 on April 15, 2009. The main text defines fire-safe polymers as those resistant to degradation at high temperatures and discusses their applications in aerospace, electronics, and military materials. A table of contents is provided, listing sections from History to References. The sidebar on the left contains navigation links such as "Main page", "Contents", "Featured content", "Current events", "Random article", "search", "interaction", and "toolbox".

Fire-safe polymers

From Wikipedia, the free encyclopedia

This is an old revision of this page, as edited by Chem538grp3w09 (talk | contribs) at 20:45, 15 April 2009. It may differ significantly from the current revision. (diff) ← Previous revision | Current revision (diff) | Newer revision → (diff)

Fire-safe polymers are polymers that are resistant to [degradation](#) at high temperatures. There is need for fire-resistant polymers in the construction of small, enclosed spaces such as skyscrapers, boats, and airplane cabins.^[1] In these tight spaces, ability to escape in the event of a fire is compromised, increasing fire risk. In fact, some studies report that about 20% of victims of airplane crashes are killed not by the crash itself but by ensuing fires.^[2] Fire-safe polymers also find application as adhesives in aerospace materials,^[3] insulation for electronics,^[3] and in military materials such as canvas tenting.^[4]

Some fire-safe polymers naturally exhibit an intrinsic resistance to [decomposition](#), while others are synthesized by incorporating fire-resistant additives and fillers. Current research in developing fire-safe polymers is focused on modifying various properties of the polymers such as ease of ignition, rate of heat release, and the evolution of smoke and toxic gases.^[1] Standard methods for testing polymer flammability vary among countries; in the United States common fire tests include the UL 94 small-flame test, the ASTM E 84 Steiner Tunnel, and the ASTM E 622 National Institute of Standards and Technology (NIST) smoke chamber.^[1] Research on developing fire-safe polymers with more desirable properties is concentrated at the University of Massachusetts Amherst and at the Federal Aviation Administration where a long-term research program on developing fire-safe polymers was begun in 1995. The Center for UMass/Industry Research on Polymers (CUMIRP) was established in 1980 in Amherst, MA as a concentrated cluster of scientists from both academia and industry for the purpose of polymer science and engineering research.^[1]

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History

Early History

Controlling the flammability of different materials has been a subject of interest since 450 B.C. when Egyptians attempted to reduce the flammability of wood by soaking it in potassium aluminum sulfate (alum). Between 450 B.C. and the early 20th century, other materials used to reduce the flammability of different materials included mixtures of alum and vinegar; clay and hair; clay and gypsum; alum, ferrous sulfate, and gypsum; and ammonium chloride, ammonium phosphate, borax, and various acids. These early attempts found application in reducing the flammability of wood for military materials, theater curtains, and other textiles, for example. Important milestones during this early work include the first patent for a mixture for controlling flammability issued to Obadiah Wyld in 1735,^[4] and the first scientific exploration of controlling flammability, which was undertaken by Joseph Louis Gay-Lussac in 1821.^[4]

Developments Since WWII

Research on fire-retardant polymers was bolstered by the need for new types of synthetic polymers in World War II. The combination of a halogenated paraffin and antimony oxide was found to be successful as a fire retardant for canvas tenting. Syntheses of polymers, such as polyesters, with fire retardant monomers were also developed around this time.^[9] Incorporating flame-resistant additives into polymers became a common and relatively cheap way to reduce the flammability of polymers,^[9] while synthesizing intrinsically fire-resistant polymers has remained a more expensive alternative, although the properties of these polymers are usually more efficient at deterring combustion.^[4]

Polymer Combustion

General Mechanistic Scheme

Traditional polymers decompose under heat and produce combustible products; thus, they are able to originate and easily propagate fire (as shown in Figure 1).

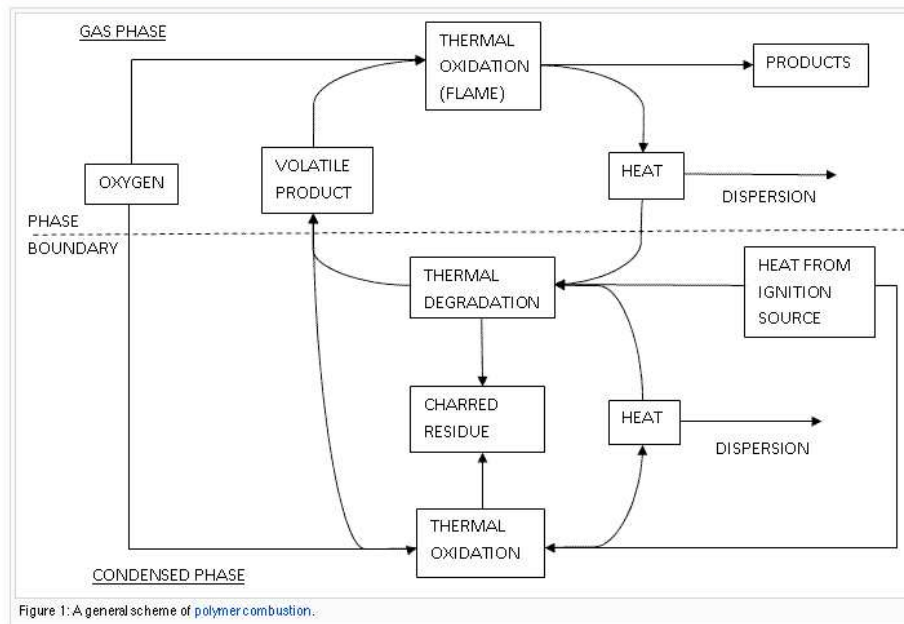


Figure 1: A general scheme of polymer combustion.

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The combustion process begins when heating a polymer yields volatile products. If these products are sufficiently concentrated, within the flammability limits, and at a temperature above the ignition temperature, then combustion proceeds. As long as the heat supplied to the polymer remains sufficient to sustain its thermal decomposition at a rate exceeding that required to feed the flame, combustion will continue.^[7]

Purpose and Methods of Fire-Retardant Systems

The purpose is to control heat below the critical level. To achieve this, one can create an endothermic environment, produce non-combustible products, or add chemicals that would remove fire-propagating radicals (H and OH), to name a few. These specific chemicals can be added into the polymer molecules permanently (see Intrinsically Fire-Resistant Polymers) or as additives and fillers (see Flame-Retardant Additives and Fillers).^[7]

Role of Oxygen

Oxygen catalyzes the pyrolysis of polymers at low concentration and initiates oxidation at high concentration. Transition concentrations are different for different polymers. (e.g., polypropylene, between 5% and 15%). Additionally, polymers exhibit a structural-dependent relationship with oxygen. Some structures are intrinsically more sensitive to decomposition upon reaction with oxygen. The amount of access that oxygen has to the surface of the polymer also plays a role in polymer combustion. Oxygen is better able to interact with the polymer before a flame has actually been ignited.^[7]

Role of Heating Rate

In most cases, results from a typical heating rate (e.g. 10°C/min for mechanical thermal degradation studies) do not differ significantly from those obtained at higher heating rates. The extent of reaction can, however, be influenced by the heating rate. For example, some reactions may not occur with a low heating rate due to evaporation of the products.^[7]

Role of Pressure

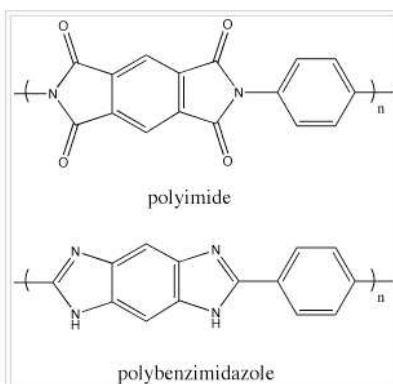
Volatile products are removed more efficiently under low pressure, which means the stability of the polymer might have been compromised. Decreased pressure also slows down decomposition of high boiling products.^[7]

Intrinsically Fire-Resistant Polymers

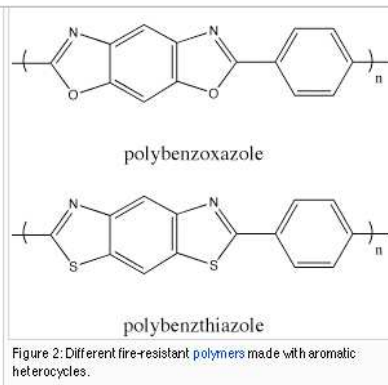
The polymers that are most efficient at resisting combustion are those that are synthesized as intrinsically fire-resistant. However, these types of polymers can be difficult as well as costly to synthesize. Modifying different properties of the polymers can increase their intrinsic fire-resistance; increasing rigidity or stiffness, the use of polar monomers, and/or hydrogen bonding between the polymer chains can all enhance fire-resistance.^[9]

Linear, Single-Stranded Polymers With Cyclic Aromatic Components

Most intrinsically fire-resistant polymers are made by incorporation of aromatic cycles or heterocycles, which lend rigidity and stability to the polymers.^[9] Polyimides, polybenzoxazoles (PBOs), polybenzimidazoles, and polybenzothiazoles (PBTs) are examples of polymers made with aromatic heterocycles (Figure 2).



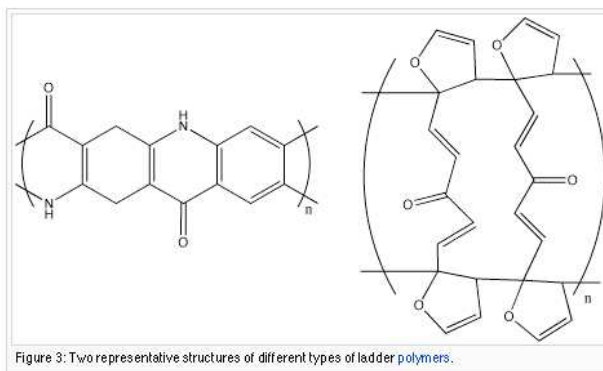
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Polymers made with aromatic monomers have a tendency to condense into chars upon combustion, decreasing the amount of flammable gas that is released. Syntheses of these types of polymers generally employ prepolymers which are further reacted to form the fire-resistant polymers.^[10]

Ladder Polymers

Ladder polymers are a subclass of polymers made with aromatic cycles or heterocycles. Ladder polymers generally have one of two types of general structures, as shown in Figure 3.



One type of ladder polymer links two polymer chains with periodic covalent bonds.^[11] In another type, the ladder polymer consists of a single chain that is double-stranded. Both types of ladder polymers exhibit good resistance to decomposition from heat because the chains do not necessarily fall apart if one covalent bond is broken. However, this makes the processing of ladder polymers difficult because they are not easily melted. These difficulties are compounded because ladder polymers are often highly insoluble.

Inorganic and Semiorganic Polymers

Inorganic and semiorganic polymers often employ silicon-nitrogen, boron-nitrogen, and phosphorus-nitrogen monomers. The non-burning characteristics of the inorganic components of these polymers contribute to their controlled flammability. For example, instead of forming toxic, flammable gasses in abundance, polymers prepared with incorporation of cyclotriphosphazene rings give a high char yield upon combustion.^[12] Polysialates (polymers containing frameworks of aluminum, oxygen, and silicon) are another type of inorganic polymer that can be thermally stable up to temperatures of 1300-1400°C.^[12]

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Flame-Retardant Additives and Fillers

Additives are divided into two basic types depending on the interaction of the additive and polymer.^[1] Reactive flame retardants are compounds that are chemically built into the polymer. They usually contain heteroatoms. Additive flame retardants, on the other hand, are compounds that are not covalently bound to the polymer; the retardant and the polymer are just physically mixed together. At present, there are basically six elements being widely used in this field: boron, aluminum, phosphorus, antimony, chlorine, and bromine. One prominent advantage of these types of fire-safe polymers is that they are relatively easy to manufacture.

Natural Fiber-Containing Composites

Besides providing satisfactory mechanical properties and renewability, natural fibers are easier to obtain and much cheaper than man-made materials. Moreover, they are more environmentally friendly.^[13] Recent research focuses on application of different types of fire retardants during the manufacturing process as well as applications of fire retardants (especially intumescent coatings) at the finishing stage.^[13]

Nanocomposites

Nanocomposites have become a hotspot in the research of fire-safe polymers because of their relatively low cost and high flexibility for multifunctional properties.^[14] Gilman and colleagues did the pioneering work by demonstrating the improvement of fire-retardancy by having nanodispersed montmorillonite clay in the polymer matrix. Later, organomodified clays, TiO₂ nanoparticles, silica nanoparticles, layered double hydroxides, carbon nanotubes and polyhedral silsesquioxanes were proved to work as well.^[14] Recent research has suggested that combining nanoparticles with traditional fire retardants (e.g., intumescent) or with surface treatment (e.g., plasma treatment) effectively decreases flammability.^[14]

Problems With Additives and Fillers

Although effective at reducing flammability, flame-retardant additives and fillers have disadvantages as well. Their poor compatibility, high volatility and other deleterious effects can change properties of polymers. Besides, addition of many fire-retardants produces soot and carbon monoxide during combustion. Halogen-containing materials cause even more concerns on environmental pollution.^[11]

See also

- Plastics
- Fireproofing
- Phenol formaldehyde resin
- University of Massachusetts Amherst
- Pyrolysis
- Combustion

External Links

- Fire-Safety Branch of the Federal Aviation Administration

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Editing Wikipedia as a Class Project Handbook

Introduction

This handbook is a how-to guide for implementing a class project that centers on the editing of Wikipedia. The project requires students to work collaboratively and explore advanced concepts in the course while learning how to communicate science to a diverse audience, including the general public. This handbook contains a detailed timeline for the project, instructions on how to edit Wikipedia, assessment metrics and sample handouts and entries. Note that Wikipedia is constantly improving and modifying the editing interface and formatting requirements, thus this handbook will need to be updated periodically. This version was last updated in January 2010. Future versions will be available on <http://www.umich.edu/~ajmlab/>.

Part 1: To the Instructor

Timeline	Responsibilities	Pages
Before start of semester	Create project outline	S12
	Create project timeline	S13
Week 1	Set up student accounts	S14
	Discuss topic considerations with students	S16
Week 3	Select final topic from student lists	S17
	Add entry to "Schools and Universities" Wikipedia Page	S18
Weeks 5-7	Evaluate student outlines	S19
	In-class demonstration on the editing of Wikipedia	S21
Week 10	Evaluate student sandbox entries	S22
Week 14	Assessment of Wikipedia Entry and Presentation	S23

Part 2: To the Student

Information	Pages
Setting up a user page and sandbox	S24
Proper Formatting for Wikipedia	S27
A. Inserting References	S28
B. Inserting Equations	S29
C. Creating and Uploading Images	S30
D. Inserting Tables	S34
E. Miscellaneous, But Useful Information	S35

Part 1: To the Instructor

CREATING THE PROJECT OUTLINE

The **project outline** should specify the following information: (1) the goals of the project, (2) the reporting method, (3) how groups will be assigned, and (4) the criteria for grading. An example is shown below.

<i>Improving Science in Wikipedia</i>	
Goal:	Your group must identify an important topic related to polymer chemistry and either create or substantially improve a Wikipedia site on that topic.
Report:	The results of your efforts (background, important concepts, additions to site) will be presented to the class in a 15 min Powerpoint presentation. Please make copies of your slides to hand out to the entire class.
Groups:	Each group will consist of 2-3 students and will be assigned.
Grading:	<p>The project will be graded on five aspects:</p> <p><u>(a) Content:</u> A minimum of 3 sections must be added to the site, including an introductory paragraph aimed at the general public. The quality and quantity of the added content will be evaluated. (25 pts)</p> <p><u>(b) Figures:</u> A minimum of 3 figures or schemes must be added to the site. Again, both quantity and quality will be evaluated. (20 pts)</p> <p><u>(c) References:</u> A minimum of 8 references must be added to the site. The quality of these references will also be evaluated. (20 pts)</p> <p><u>(d) Presentation:</u> Each group member must participate in the presentation and present their <u>individual</u> contribution to the site. You will be graded <u>individually</u> on the clarity and content of your presentation. (25 pts)</p> <p><u>(e) Attendance:</u> You must attend all presentation classes to receive full credit. (10 pts)</p>

CREATING THE PROJECT TIMELINE

At this time, a **project timeline** should be also created. Several checkpoints for the project should be included in order to encourage students to be working on the project throughout the semester. An example is shown below.

<u>Wiki-Project Timeline</u>	
January 16, 2009	Group assignments are given.
January 30, 2009	Each group will turn a 1-page description of their top three topic choices and their reasoning. Be sure to check Wikipedia for current sites on the topic.
March 6, 2009	Each group will turn in an MS word outline of their site or additions. Cheryl will give a class presentation on how to update Wikipedia.
April 3, 2009	Each group will turn in the "sandbox" version of their site for feedback. Once the final edits are made the site can be put online.
April 13, 2009	Group 1 and Group 5 will present in class.
April 15, 2009	Group 2 and Group 4 will present in class.
April 17, 2009	Group 3 and Group 6 will present in class.

SETTING UP STUDENT ACCOUNTS

The management and assessment of the project is streamlined through assigning readily identifiable “login names” to each student group. For example, group 1 in the Chem 540 course in Fall 2008 is **chem540grp1f08**. The assignment of group names makes it easy to track the edits, even when other people continue to edit the site, since each Wikipedia site contains a detailed history of all edits by username.

Passwords for each login name can be created by using the group members’ first names so they are easy to remember.

To create a Wikipedia account:

- At the Wikipedia homepage http://en.wikipedia.org/wiki/Main_Page, click on the “Log in/create account” link.



The screenshot shows the Wikipedia homepage with the following elements:

- Top navigation: [main page](#), [discussion](#), [view source](#), [history](#)
- Header: [Log in / create account](#)
- Left sidebar: **WIKIPEDIA The Free Encyclopedia**, navigation menu (Main page, Contents, Featured content, Current events, Random article), search box, interaction menu (About Wikipedia, Community portal, Recent changes, Contact Wikipedia, Donate to Wikipedia, Help), and toolbox (What links here).
- Main content area: **Welcome to Wikipedia**, the free encyclopedia that anyone can edit. 2,920,766 articles in English. Overview · Editing · Questions · Help.
- Right sidebar: **Arts**, **History**, **Society**, **Biography**, **Mathematics**, **Technology**, **Geography**, **Science**, **All portals**. Contents · Categories · Featured content · A–Z index.
- Featured article: **Today's featured article** - *In Utero* by Nirvana.
- News section: **In the news** - The Acropolis Museum opens in Athens, Greece; Tropical Depression One-E impacts Mexico; NASA launches the Lunar Reconnaissance Orbiter; At least 18 soldiers are ambushed and killed in Algeria; The BRIC countries hold their first official summit in Russia; At least 20 people are killed in Tehran.

- The following screen should appear, click on: “Don’t have an account? **Create one**”



- Also create an account for yourself. This account is necessary in order to make an entry on the “Schools and University Projects” Wikipedia page.

HELPFUL HINTS

- Group sizes consisting of 3 students are recommended.
- Assign groups after the first week of classes to accommodate students who add or drop the course.
- There is a maximum of 6 accounts that you can make in a 24 hr period with a given IP address. Creating the remaining accounts on an alternative computer can circumvent this limit.

DISCUSS TOPIC CONSIDERATIONS WITH STUDENTS

Each student group should submit three potential topics that are related to course material but not already adequately described in Wikipedia. The students should identify the strengths and weaknesses of the current entry and propose changes and additions.

When choosing topics, students should consider the unique attributes of Wikipedia, which are outlined in the **Wikipedia: What Wikipedia is not** guide:

http://en.wikipedia.org/wiki/Wikipedia:What_Wikipedia_is_not.

Students should refer to this guide when deciding on a topic.

The following points were highlighted:

- Wikipedia is not a place to publish your own thoughts and analyses or to publish new information not previously published.
- Articles about living people are required to meet an especially high standard, as they may otherwise be libelous or infringe the subjects' right to privacy.
- Biography articles should only be for people with some sort of fame, achievement, or perhaps notoriety.
- Wikipedia is an encyclopedic reference, not a textbook. The purpose of Wikipedia is to present facts, not to teach subject matter. It is not appropriate to create or edit articles that read as textbooks, with leading questions and systematic problem solutions as examples.
- A Wikipedia article should not be presented on the assumption that the reader is well versed in the topic's field.

It is often possible that topics indicated by the students' as being new sites may already be an entry in Wikipedia, but under an alternative spelling or name. Wikipedia will suggest closely related pages/entries that appear below the prompt that suggest a new entry can be created. Look carefully at these search results to see if the topic is already covered.

HELPFUL HINTS

- Ask the students to create a bulleted list of proposed changes/additions.
- Suggest the students submit their files with the filename "grp1_topic".

SELECT FINAL TOPIC FROM STUDENT LISTS

The instructors select the final topic for each group based on the following criteria:

- Consider the importance of the topic and relevance to the field of chemistry.
- Verify that the proposed changes to an existing site can be done in the given time period.
- The topic should be relevant to the class material.
- Preference is given to topics that were not in existence or require significant site alterations.
- Ensure that topics do not overlap in the same term.

ADD ENTRY TO "SCHOOLS AND UNIVERSITIES" WIKIPEDIA PAGE

At the "Schools and University Projects" Wikipedia page http://en.wikipedia.org/wiki/Schools_and_universities_project, click "edit this page" at the top of the window and add an entry about your project under your institution, including the topics that will be edited/added by your students.

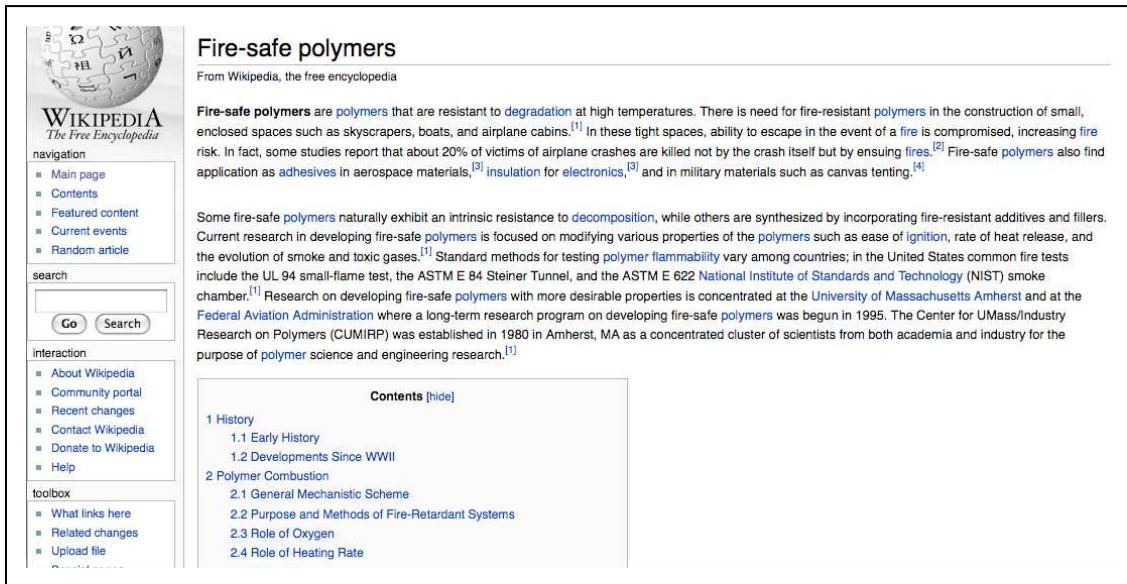
See below for a sample entry:

<p>University of Michigan (Fall 2008 and Winter 2009) (Ongoing) [edit]</p> <p>A graduate course in physical organic chemistry (26 students) is adding content in the area of transition state theory, asymmetric induction, chiral lewis acid, benson group increment theory, the hammett equation, the taft equation, halogen bonding, hyperconjugation, and pi-interactions. This particular project will terminate in December 2008. Questions to ajm_mich (talk) 14:38, 11 December 2008 (UTC)</p> <p>A graduate course in the organic chemistry of macromolecules (12 students) will be adding content to wikipedia. Topics selected for improvement include anionic polymerization, gel permeation chromatography, fire-safe polymers (new site), shape memory polymers, step-growth polymerizations, and covalent organic frameworks (new site). The students will be posting their revamped sites in mid-April. Stay tuned for more details! Questions to Ajm mich (talk) 02:08, 11 February 2009 (UTC)</p>

EVALUATING STUDENT OUTLINES

The format of the **outlines** should mimic the “Contents” box on the Wikipedia page. The students are told that the more detail they provide in the outline, the more feedback they will have early on in the project.

An example of the outline format is shown below.



The screenshot shows the Wikipedia article for "Fire-safe polymers". The article text discusses the resistance of polymers to degradation at high temperatures and the need for fire-resistant polymers in construction. It mentions various tests like the UL 94 small-flame test and the ASTM E 84 Steiner Tunnel. A "Contents" box is visible, listing sections such as History, Polymer Combustion, and Intrinsic Fire-Resistant Polymers.

Fire-Safe Polymers

1 History

- 1.1 Early History
- 1.2 Developments Since WWII

2 Polymer Combustion

- 2.1 General Mechanistic Scheme
- 2.2 Purpose and Methods of Fire-Retardant Systems
- 2.3 Role of Oxygen
- 2.4 Role of Heating Rate
- 2.5 Role of Pressure

3 Intrinsically Fire-Resistant Polymers

- 3.1 Linear, Single-Stranded Polymers With Cyclic Aromatic Components
- 3.2 Ladder Polymers
- 3.3 Inorganic and Semiorganic Polymers

4 Flame-Retardant Additives and Fillers

- 4.1 Natural Fiber-Containing Composites
- 4.2 Nanocomposites
- 4.3 Problems With Additives and Fillers

5 See also

6 External links

7 References

HELPFUL HINTS

- Consider the length of time needed to adequately cover all of the topics in the proposed outline.
- Encourage the students to use a broad range of accurate and readily available resources that would be accessible to the general public; for example, the primary scientific literature is often difficult to access without an institution's license.

IN-CLASS DEMONSTRATION

Part 2 of this manual describes how to edit Wikipedia in more detail. The in-class demonstration highlights the key points of the following topics:

- Proper formatting
 - Wikipedia has strict formatting requirements. They offer a style guide with detailed descriptions of these requirements.
http://en.wikipedia.org/wiki/Wikipedia:Manual_of_Style
- Uploading Images
 - The students should create all their own images and figures used on the page and give free license use to them.
 - Prior to uploading an image to the site, the image must first be uploaded to a common server called Wikimedia Commons.
- References
 - When citing journal articles, provide article titles and the digital object identifier (DOI) number.
- Hyperlinks
 - The Wikipedia community merits an entry/topic based on the public's interest. Therefore, in order to increase the visibility of your topic, the students should hyperlink all pages relevant to their own entries.

HELPFUL HINTS

- Have the students bring their computer to class and follow along as you demonstrate how to edit Wikipedia.

EVALUATING SANDBOX ENTRIES

To evaluate the students' sandbox version you must first go to the user page for each group and then click on the "sandbox" link.

For example, for the username **Chem540f09grp1** the link to the user page is as follows:

<http://en.wikipedia.org/wiki/User:Chem540f09grp1>

The sandbox entries were evaluated based on the following criteria:

- Introductory Section: Is it at a level that the general public can understand? Are there a sufficient number of hyperlinks to other Wikipedia articles to provide definitions of complex concepts?
- Main Article: Is the language and flow between sections consistent? Are there a significant number of typos or misspellings? Should sections be combined or split? Are all the examples appropriate? Is it correctly formatted for Wikipedia? Are there a sufficient number of links to other Wikipedia articles?
- Images: Are the images chemically accurate? Do they represent a clear example of the concept? Were they originally produced? Is the resolution sufficient? Is more or less data needed in table format?
- References: Are the key references in this area cited? Are they accurate? Is there a mix of primary literature and books, websites, etc.

The students are then allowed to revise their site before putting it online.

ASSESSMENT OF WIKIPEDIA ENTRY AND PRESENTATION

Assessment is based on completion of the assigned criteria within their entry and the quality of an in-class presentation highlighting the changes that were made.

The assigned criteria were as follows:

- A minimum of 8 references must be added.
- A minimum of 3 sections must be added, including an introductory paragraph aimed at the general public.
- A minimum of 3 original figures or schemes that enhance explanations of the topic must be added.
- Hyperlinks to their entry from other related entries as well as links to related topics within their entry must be included.

The history of each page is kept indefinitely therefore it is easy to assess the student group contributions to the page even when others in the Wikipedia community subsequently make changes. Assigned group login names facilitate tracking of these changes.

Part 1: To the Student

SETTING UP A USER PAGE AND SANDBOX

The **user page** is where you will set up your sandbox and create your “practice” page before uploading it to Wikipedia. The sandbox feature prevents other Wikipedians from editing/altering your site while you are working on it.

To create your user page:

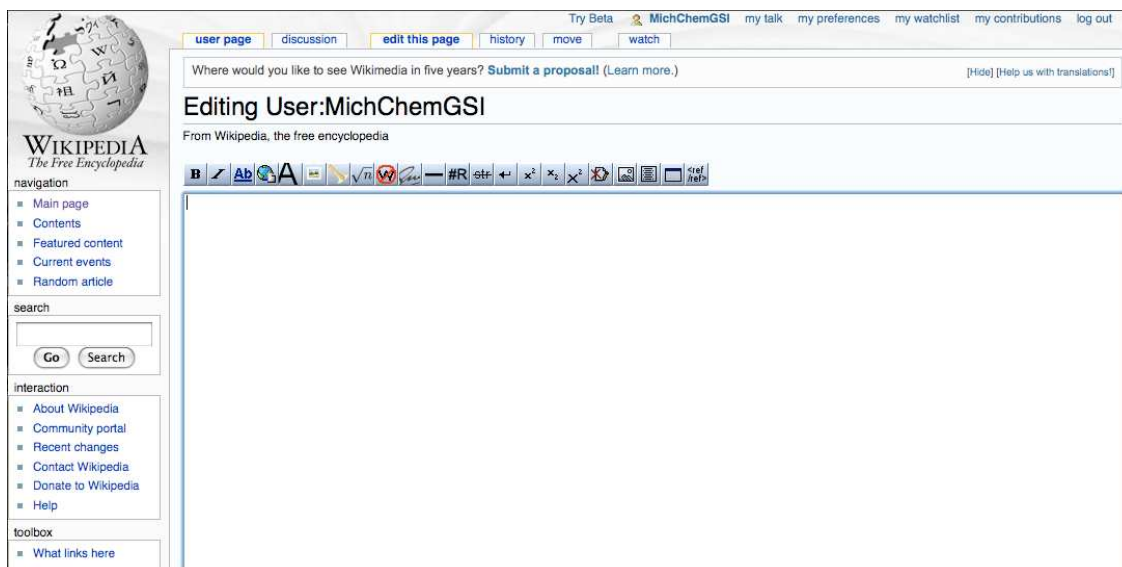
- After you log in with your user name and password assigned to you by the instructor, you will be redirected to Wikipedia’s homepage. At the top of the page you will see your login name (here it is MichChemGSI). Click on your login name to go to your user page.



The screenshot shows the Wikipedia homepage for the user MichChemGSI. At the top, there are navigation tabs for 'main page', 'discussion', 'view source', 'history', and 'watch'. Below this is a banner asking 'Where would you like to see Wikimedia in five years? Submit a proposal!'. The main heading reads 'Welcome to Wikipedia, the free encyclopedia that anyone can edit. 3,010,284 articles in English'. To the right of the welcome message is a grid of category links: Arts, Biography, Geography, History, Mathematics, Science, Society, Technology, and All portals. Below the welcome message are links for 'Overview · Editing · Questions · Help' and 'Contents · Categories · Featured content · A–Z index'. The 'Today's featured article' section highlights Edward Wright (1561–1615), an English mathematician and cartographer. The 'In the news' section lists several recent events, including Stefania Fernández of Venezuela winning the Miss Universe 2009 pageant, the England cricket team regaining The Ashes, and the discovery of the Tianyuraptor dinosaur.

- Once on your user page, click on the tab at the top labeled “edit this page”.

The following page will appear:



- Type: `{{userpage}}` in the text box.
This will insert a disclaimer telling people that they have reached a user page.
- Click on the “save page” button.

Your user page should now look like this:



Next you should create a “**sandbox**” in your user page. The sandbox is a space for you to create, edit, and preview your page prior to uploading a “live” page on Wikipedia.

To create your sandbox:

- On your user page, click on the tab at the top labeled “edit this page”.

Underneath the code for `{{userpage}}` type: `[[/sandbox]]` *This code will create a link to your sandbox on your user page.*

Click on the “save page” button.

To edit your sandbox:

- Click on the new [/sandbox](#) link and a new editing text box will appear. You may begin editing your site here. *Note that after your initial save within sandbox, the editing text box will not initially show up, but rather the work thus far on your page. As a result, you will need to click on the “edit this page” tab at the top of the page.*



Once you are ready to upload your sandbox version to the live site, go to the destination site and click on the “edit this page” tab. Copy the entire source code from your sandbox and paste and insert it where you are making changes to the original source code. Don’t forget to click “save page”!

If you are making a new site, search for the topic in Wikipedia. When Wikipedia indicates that the page does not exist, click on the topic linked in **red** to create that page.

PROPER FORMATTING FOR WIKIPEDIA

This portion of the manual covers the following formatting topics:

- A. Inserting References
- B. Inserting Equations
- C. Creating and Inserting Images
- D. Inserting Tables
- E. Miscellaneous, But Useful Information

For all other formatting questions, please refer to style guide on Wikipedia.

http://en.wikipedia.org/wiki/Wikipedia:Manual_of_Style

A. INSERTING REFERENCES

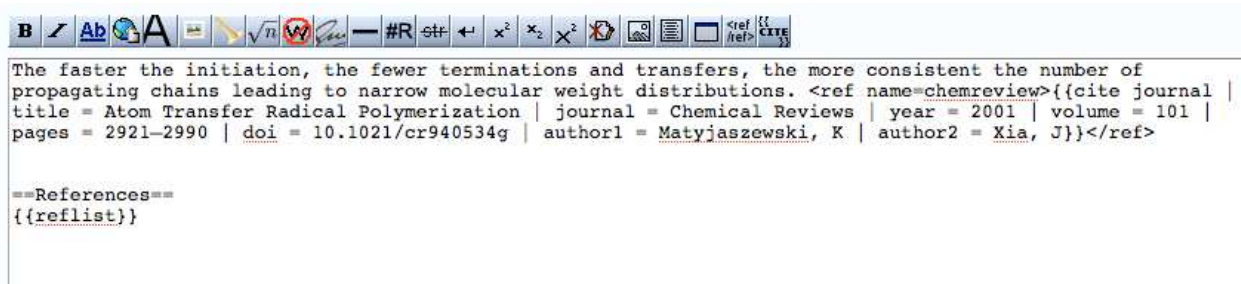
The list of references at the end of the entry is generated by Wikipedia based on a set of commands you inserted within your entry. When you need to insert a reference, the following commands should be placed after the sentence you are referencing:

Command	What it does
<code><ref name= ></code>	After the equal sign, insert a code name you would like to call this particular reference. This code name can be useful for references that will be cited multiple times in the article. Note that code names can only be one word with no spaces.
<code>{{cite journal author=</code>	After the equal sign, insert the author of the article. This command will arrange the various citation components correctly.
<code> journal =</code>	Journal title
<code> year =</code>	Year of publication
<code> volume =</code>	Journal volume
<code> pages =</code>	Page numbers
<code>doi =</code>	To hyperlink the DOI
<code></ref></code>	Ends reference command

At very end of entry, type the following command:

Command	What it does
<code>{{reflist}}</code>	This will compile the links of your references together at the end of the entry.

Example:

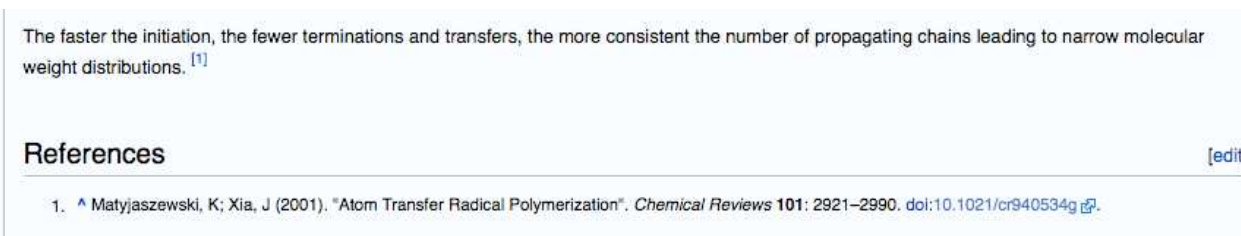


```

The faster the initiation, the fewer terminations and transfers, the more consistent the number of propagating chains leading to narrow molecular weight distributions. <ref name=chemreview>{{cite journal | title = Atom Transfer Radical Polymerization | journal = Chemical Reviews | year = 2001 | volume = 101 | pages = 2921–2990 | doi = 10.1021/cr940534g | author1 = Matyjaszewski, K | author2 = Xia, J}}</ref>

==References==
{{reflist}}
```

What it looks like on the site:



The faster the initiation, the fewer terminations and transfers, the more consistent the number of propagating chains leading to narrow molecular weight distributions.^[1]

References

1. ^ Matyjaszewski, K; Xia, J (2001). "Atom Transfer Radical Polymerization". *Chemical Reviews* **101**: 2921–2990. doi:10.1021/cr940534g.

[edit]

B. INSERTING EQUATIONS

The following example of inserting an equation is from the Step-Growth Polymerization page. http://en.wikipedia.org/wiki/Step-growth_polymerization

Command	What it does
<code><math></code>	To indicate that an equation follows.
<code>\frac{numerator}{denominator}</code>	If fractions are used
<code>{ }</code>	Used to group parts of an equation
<code>()</code>	Parenthesis
<code>[]</code>	Concentration
<code></math></code>	Ends equation command

Example:

```
:<math>\frac{1}{1-p^{n-1}}=1+(n-1)kt[COOH]^{n-1}</math>
This is a general rate law degree of polymerization for polyesterification
where n= reaction order.
```

What it looks like on the site:

$$\frac{1}{1-p^{n-1}} = 1 + (n-1)kt[COOH]^{n-1}$$

This is a general rate law degree of polymerization for polyesterification where n= reaction order.

C. CREATING AND INSERTING IMAGES

You must produce your own images! The images must be original work that you will freely license for public use. First you must upload your images into the Wikimedia Commons page so that they are freely available to the public.

- Go to Wikimedia Commons and sign in with your user name and password.
http://commons.wikimedia.org/wiki/Main_Page
- Click on “upload file” under the participate box on the left sidebar.



- Click on the first option: “it is entirely my own work” link.



- Read through the requirements on the page, then scroll down to the form and upload your file.

Upload your own work

Local filename:

Maximum file size: 100 MB
Permitted file types: png, gif, jpg, jpeg, xcf, mid, ogg, ogv, svg, djvu, tif, tiff, oga.

Destination filename:
Name of the file at Commons after the upload. Use a descriptive file name (tips).

Original source:
Where does this file come from?

Author(s):
Who created this file? Also, if it shows some artwork, who created that?

Date of the work:
Date of creation and/or first publication of the work ("YYYY-MM-DD" format).

Description:

English

HELPFUL HINTS

- Save images as JPEG or PNG files.
- Remember the “destination filename” you assign. This file name is case sensitive.
- Make sure to select the “public domain” option from the licensing menu.

After uploading your image to Wikimedia Commons, you can now insert them into your entry.

Insert your image with the following commands:

Command	What it does
<code>[[image:]]</code>	Insert your “destination filename” after the colon.
Thumb	Creates your file into a thumbnail sized image
“size”px	Indicate the pixel size that you would like your image to be displayed.
Center	Arrangement of the image in the entry. The options are left, right, and center.
General ATRP Reaction	Caption for image

Between each of your commands for the image (size, arrangement, caption), a vertical line must be placed to separate each command within the double brackets.

The vertical lines can be found at the bottom of the editing page.

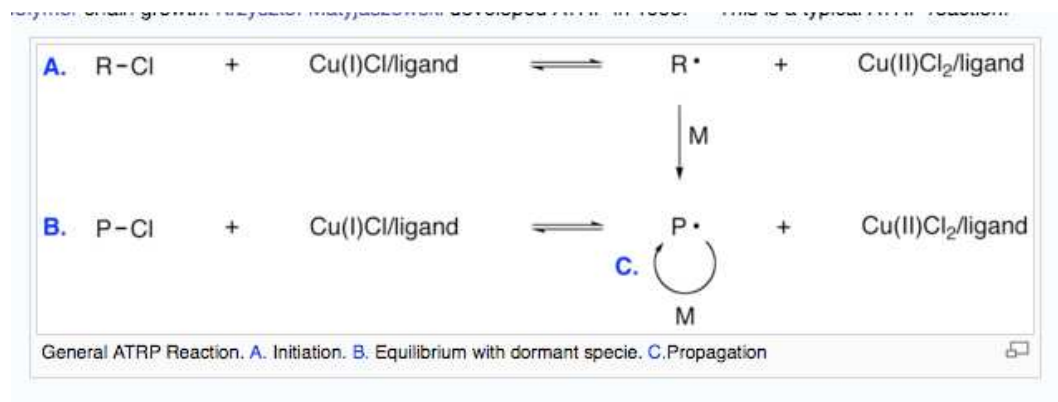
```
Wiki markup  {{{}} | [] [] [[Category:]] #REDIRECT [[]] &nbsp; <S></S> <sup></sup> <sub></sub> <code>
</code> <blockquote></blockquote> <ref></ref> {{Reflist}} <references/> <includeonly></includeonly>
<noinclude></noinclude> {{DEFAULTSORT:}} <nowiki></nowiki> <!-- --> <span class="plainlinks"></span>
```

Example:

This is a typical ATRP reaction:

```
[[Image:ATRP_general.png|thumb|600px|center|General ATRP Reaction. <span style="color: blue">A.</span> Initiation. <span style="color: blue">B.</span> Equilibrium with dormant specie. <span style="color: blue">C.</span> Propagation]]
```

What it looks like on the site:



HELPFUL HINTS

- For other image modifications, refer to: http://en.wikipedia.org/wiki/Wikipedia:Extended_image_syntax
- Sometimes it is useful to find other pages with high quality images that are of the size and arrangement you would like. Copy and paste their code into your site and replace the image with your image.

GUIDELINES FOR CREATING SIMPLE, YET HIGH QUALITY ARTWORK

A picture can often clarify and simplify a key concept within a Wikipedia entry. When making an image, ask, "What is the simplest molecule or equation that will get across this important concept?" In addition, ask, "Can a table be used to summarize any of the key trends or to compare and contrast this concept to another related concept?"

To make a high-quality image using Chemdraw:

- Create a new Chemdraw file and utilize the preset settings for ACS journals by selecting: File → Adopt document settings from → ACS Document 1996
- Once the structures and equations are complete, select all and modify the object settings by selecting: Object → Object settings → alter the bold length to **0.03** and alter the line width to **0.015**.
- To normalize bond lengths and angles select: Structure → Clean up structure
- To keep structures aligned in an equation select: Object → Align
- Save the image as a png file.

- Upload the file onto Wikipedia Commons as the original file size. This size will allow readers to be able to see a larger version of the image when a clicking on it within the site.

D. INSERTING TABLES

Command	What it does
{ class = "wikitable"	Begins table formatting
style="text-align:center"	Centers text in table
-	(vertical line with dash) Begins and ends each row
!'"heading 1"'!	Begins initial heading
	(one vertical line) Indicates the start of content for row
	(two vertical lines) Begins and ends each column
}	Terminates table

Example:

```
{|class="wikitable" style="text-align:center"
|-
|'"Step-growth polymerization'"|'"Chain-growth polymerization'"
|-
|Growth throughout matrix||Growth by addition of monomer only at one end of chain
|-
|Rapid loss of monomer early in the reaction||Some monomer remains even at long reaction times
|-
|Same mechanism throughout||Different mechanisms operate at different stages of reaction (i.e. Initiation,
propagation and termination)
|-
|Average molecular weight increases slowly at low conversion and high extents of reaction are required to obtain
high chain length||Molar mass of backbone chain increases rapidly at early stage and remains approximately the
same throughout the polymerization
|-
|Ends remain active (no termination)||Chains not active after termination
|-
|No initiator necessary||Initiator required
|-
|
|}
```

What it looks like on the site:

Step-growth polymerization	Chain-growth polymerization
Growth throughout matrix	Growth by addition of monomer only at one end of chain
Rapid loss of monomer early in the reaction	Some monomer remains even at long reaction times
Same mechanism throughout	Different mechanisms operate at different stages of reaction (i.e. Initiation, propagation and termination)
Average molecular weight increases slowly at low conversion and high extents of reaction are required to obtain high chain length	Molar mass of backbone chain increases rapidly at early stage and remains approximately the same throughout the polymerization
Ends remain active (no termination)	Chains not active after termination
No initiator necessary	Initiator required

E. MISCELLANEOUS, BUT USEFUL INFORMATION

Wikipedia will automatically generate a table of contents at the top of each page based on your section headings.

<code>== Level 1 ==</code>	Level 1
<code>=== Level 2 ===</code>	Level 2
<code>==== Level 3 ====</code>	Level 3
<code>===== Level 4 =====</code>	Level 4
<code>===== Level 5 =====</code>	Level 5

HELPFUL HINTS

- Open the source pages of entries that are doing something that you like and copy/paste their formatting code into your entry.
- The following link is a quick reference guide of editing commands:
<http://en.wikipedia.org/wiki/Wikipedia:Cheatsheet>
- The longer version can be found here:
http://en.wikipedia.org/wiki/Wikipedia:How_to_edit_a_page