

# Interactive e-book for a unique chemistry course

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## Teaching an interdisciplinary course to meet the needs of a different department

- This interdisciplinary course delivers a scientist's perspective to chemical engineering processes.
- Projects and applications such as solar cells, batteries and catalysts are discussed.
- New current research practices are added regularly.
- Lecture discussions empower students with tools to think about applying scientific knowledge to improve on application process.

## What and why

- Chem 250 is a unique, customized inorganic chemistry course for 120-150 students in the Chemical Engineering program.
- **Course Learning Objectives:**
  - Introduction to inorganic chemistry
  - Introduction to industrial processes involving inorganic compounds
  - Connecting chemical principles to industrial applications from a scientist's perspective

### Inorganic Textbook

Detailed scientific principles, insufficient chemical engineering applications

### Industrial Chemistry Textbooks

Numerous processes and applications, insufficient scientific background

### Customized, comprehensive interactive **FREE** e-book with complementary lecture notes

Basic scientific background information  
List of applications with references to scientific principles

## Why e-book instead of a new hard copy textbook

- With a hard copy published textbook, regular updates are difficult and depend on publishers
- Customization of published book has limited scope
- Applications are generalized; local industrial connection may not be possible.
- Cost to students – published textbooks are expensive.
- New e-book presents one editable online resource with all the relevant information in one place.
- This e-book can be modified as per the pedagogical goals of new instructors/ courses.

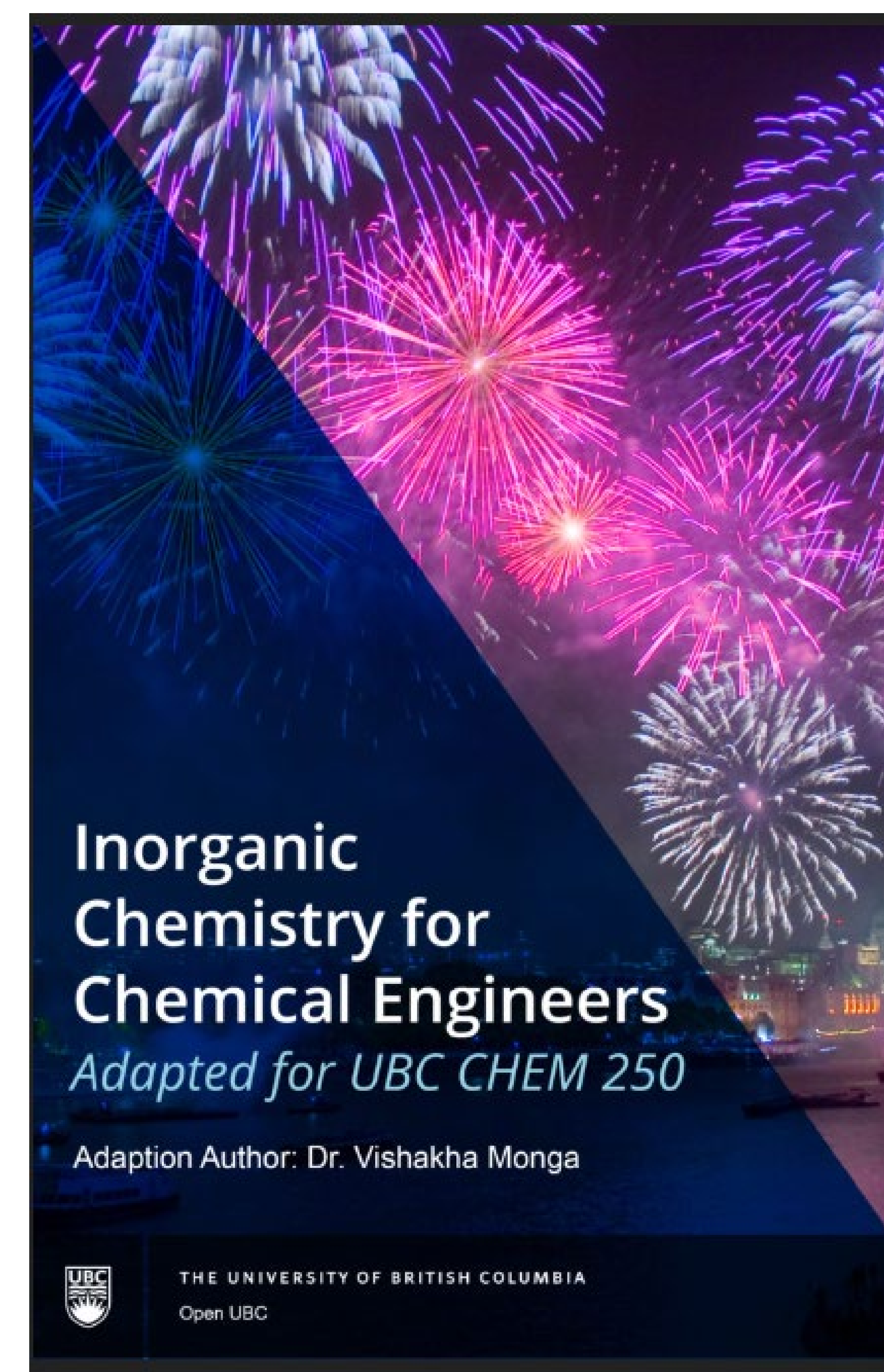
## Why adapt an existing source?

- Background information for inorganic chemistry principles well known and published on OpenStax and Libre texts.
- Existing e-books provide practice examples for basic concepts and include some embedded simulation softwares
- E-books allowed flexibility to publish/ hide certain chapters depending on curriculum needs per year.
- Class notes/ PowerPoint files added/ edited as links as necessary.

## Link and license for the customized e-book prepared in 2020/21

The e-book is based on the pressbooks site and has an open copyright license for editing as required.

<https://pressbooks.bccampus.ca/inorganicchemistrychem250/>



Front cover of the e-book

## Interesting facts about this OER

- Live Updates/ Editable in real-time
- Hard Copy/ Online version
- Interactive features, simulations and videos
- Freely accessible for other related projects/ courses even after completion of this course
- Embedded resources with current and/or local industries in the field
- Connecting students with potential employers
- YouTube video links for demonstrations
- One source for background information and new, advanced applications.

Example of links at the of chapters

Some useful links for hydrogen fuel cells:

- [http://oceangeochemical.org/archive-old/hydrogen/?gclid=CjwKCAjwmKlZBRBeEiwACCvIhsABIGBTswekW5\\_kzrsEHD77YnZ2uk6IUPTV49A2jHaTr\\_4OHiiXRoCGXEQAvD\\_BwE](http://oceangeochemical.org/archive-old/hydrogen/?gclid=CjwKCAjwmKlZBRBeEiwACCvIhsABIGBTswekW5_kzrsEHD77YnZ2uk6IUPTV49A2jHaTr_4OHiiXRoCGXEQAvD_BwE)
- <https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation/resource-library/hydrogen-and-fuel-cells-sector-status-and-vehicle-use-canada/21959>
- <https://www.theglobeandmail.com/drive/culture/article-hydrogen-fuel-cell-cars-create-zero-emissions-and-fill-up-faster/>
- <https://www.cbc.ca/news/business/hydrogen-toyota-atco-enbridge-1.4788068>
- <https://www.nationalgeographic.com/environment/global-warming/fuel-cells/>
- <https://www.mdpi.com/2076-3417/9/11/2296>

Some useful links for rechargeable vs non-rechargeable batteries:

- <https://www.science.org.au/curious/technology-future/what-makes-battery-rechargeable>
- <https://www.microbattery.com/blog/post/rechargeable-vs-non-rechargeable-batteries-the-pros-and-cons/>

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