

Materials Chemist II (Synthetic Carbon & Surface Chemistry)

Location: Burnaby, BC (onsite)

Department: R&D – Advanced Materials

About the Role

Hydrogen In Motion (H2M) is advancing next-generation hydrogen storage materials. We are seeking a **mechanistically minded Synthetic Chemist** to lead the development of functionalized graphene oxide (GO) and advanced carbon sorbents.

Unlike standard materials roles, this position requires **deep organic and inorganic synthetic expertise**. You will not just characterize materials; you will engineer their formation at the molecular level—managing complex intercalation dynamics, oxidation states, and surface functionalization. You will own the "wet chemistry" from beaker to reactor, ensuring we can synthesize high-performance sorbents safely and reproducibly.

What You'll Do

- **Lead the Synthetic Strategy:** Design and execute complex synthetic pathways for **chemically modified graphenes**, intercalated compounds, and hybrid composites. Move beyond "cook-and-look" by applying **mechanistic organic chemistry** to tune interlayer spacing and surface topology.
- **Reaction Engineering & Safety:** Manage the chemistry of **energetic oxidants and strong acids** (e.g., Modified Hummers, Brodie). Identify and mitigate reaction hazards—such as **gas evolution (ClO₂, Cl₂) and thermal runaways**—through rigorous process control and understanding of reaction kinetics.
- **Surface Functionalization:** Use organic transformation logic (epoxidation, carboxylation, pillaring) to precise-tune the material's affinity for hydrogen. Convert "bugs" (organosulfates, impurities) into features through targeted washing and post-processing.
- **Characterization & Structure-Property Relations:** Correlate synthetic inputs with material outputs using XRD (interlayer spacing), XPS (functional group distribution), and NMR/FTIR.
- **Scale-Up:** Translate sensitive gram-scale synthesis into robust kilogram-scale processes, solving problems related to **viscosity, filtration resistance (peptization), and heat transfer** in non-Newtonian slurries.

Qualifications

Must-Have

- **PhD in Organic Chemistry, Synthetic Materials Chemistry**, or a closely related field (focus on synthesis is mandatory).
- Deep theoretical and practical knowledge of **Carbon Chemistry** (Graphene Oxide, Graphite Intercalation Compounds, Carbon Nanotubes).

- Ability to think in **reaction mechanisms**: You understand *why* a reaction failed based on electron flow, steric hindrance, or thermodynamic barriers (Stage 1 vs. Stage 2 intercalation).
- Experience handling **hazardous wet-chemical processes** (strong oxidizers, concentrated acids) and a track record of implementing rigorous safety protocols for reactive chemicals.
- Competence with data analysis and DOE (Design of Experiments) to optimize complex reaction parameters.

Nice-to-Have

- Experience with **pillaring chemistry** (MOFs/COFs, cross-linking agents).
- Knowledge of hydrogen storage physics (adsorption isotherms, heats of adsorption).
- Background in polymer chemistry or colloidal science (understanding gelation and rheology).

Why H2M

- **Chemistry-First Culture**: We respect the complexity of synthesis. You won't just be mixing powders; you will be doing real chemistry to solve global energy challenges.
- **End-to-End Ownership**: From the fume hood to the prototype hydrogen tank.
- **Growth & Autonomy**: Lead the chemical definition of our core technology.

Work Environment

- Full synthesis suite including temperature-controlled reactors and overhead stirring systems.
- Access to high-pressure hydrogen testing, gloveboxes, and sorption analyzers.
- Safety-first culture with comprehensive training on energetic materials.