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Two Laurier chemists receive prestigious Early Researcher Awards

WATERLOO – Two chemistry professors in Wilfrid Laurier University's Faculty of Science have been awarded prestigious Early Researcher Awards from Ontario's Ministry of Research and Innovation.

Hind Al-Abadleh and Kenneth Maly have each been awarded up to $100,000 over a five-year term to facilitate their innovative research. In addition to the province's funding, each professor will receive a $50,000 matching award from Laurier.

"We are extremely pleased that Hind's and Ken's research is being recognized by the Ministry of Research and Innovation," said Abby Goodrum, Laurier's vice-president: research. "They are two fine examples of the cutting-edge research taking place in Laurier's growing Faculty of Science."

The title of Al-Abadleh's research is "Investigating the reactivity of engineered nanomaterials under industrial and atmospheric conditions through surface science, computational chemistry and mathematical modeling."

"The energy sector faces challenges that include arsenic content in fuel, waste water, and particulates emitted from their activities," Al-Abadleh said.

Specifically, Al-Abadleh is investigating how nanomaterials containing oxides and hydroxides of iron, manganese and titanium react with arsenic.

Arsenic is one of the heavy metals that accumulate in fossil fuels such as coal and petroleum as a result of biogeochemical processes. The presence of arsenic in fuels damages the catalysts used in converting them to other useful chemicals. Activities such as mining, smelting, and petroleum refining also release arsenic into waste water.

One of the questions Al-Abadleh is trying to address is the efficiency of nanomaterials in arsenic removal from crude fuels and waste water. She is also concerned about the impact on the chemistry of the atmosphere brought about by nanomaterials released as fly ash through combustion.

Ken Maly's research project is called "Synthesis and characterization of new self-assembled organic molecular materials from aromatic building blocks."

"I'm a synthetic organic chemist, which means I make molecules by connecting carbon atoms together," he said.

(more)

One of Maly's research directions is making compounds that exhibit liquid crystalline phases — a phase, in this case, being a state of matter, such as liquid, gas or solid.

"Liquid crystals are in between solids and liquids, with properties of both," he said. "They are fluid, like liquids, but their molecules are ordered. Using synthetic organic chemistry techniques, we can make changes to molecular structure and study how these structural changes will influence the liquid crystalline properties.

"My ultimate goal is to make things that can be used in devices." Consider solar cells: They currently use incredibly pure silicon, which is expensive. Materials like liquid crystals may offer a more economical alternative. And at a more fundamental level, the research is helping us understand how matter can organize itself."

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