Composition for and method of making multifaceted asphaltenes-derived nanoparticle

Synthetization of asphaltenes-derived quantum dots (AQDs)

TECH ID #: 2023-075

Scalable and consistent synthesis of AQDs using an organic solvent and HNO_3, H_2SO_4, or a combination thereof

AQDs show high mass yield and hydrophilicity that outperforms most available hydrophilic nanomaterials

AQDs show resistance to degradation by repeated cycles of light exposure and biocompatibility potential

PCT application filed

Collaboration opportunities: seeking research or licensing partnership

Background

Asphaltenes are present in several oil sources and their precipitation and subsequent deposition in pipelines significantly reduce productivity of oilfields. Also, production from oilsands has garnered increasing environmental concerns which necessitates the development of technologies that utilize asphaltenes as feedstock to generate high-value materials for practical applications.

While carbon fibers have been investigated extensively as potential value-added products, asphaltenes-derived quantum dots ("AQDs") have not. Researchers at University of Calgary developed a strategy to generate super hydrophilic AQDs from asphaltenes at improved mass yield and low synthesis temperature. The AQDs are also non-toxic with easy surface functionality and size tunability and are readily obtained with indistinguishable properties from various sources of asphaltenes. Benefiting from the low cost of the asphaltenes precursor and the scalable synthesis route, the inexpensive AQDs were demonstrated as a platform technology for multiple applications in energy, environment and biomedical sectors.

Competitive Advantages

- Synthesis of AQDs from one or more sources of asphaltenes
- AQDs are non-toxic and easily re-dispersible in water
- AQDs synthesized with easily tuned surface charge and size
- AQDs synthesized at low temperatures

Areas of Application

- Nano-based water-lubricant additive
- Clinical biomarkers for cancer imaging and phototherapy
- Biosensors for metal ions and antioxidants

Resources

- Researcher Profile: Prof. Milana Trifkovic
- Lab website: The Trifkovic Research Group

Interested in using this technology to help your business grow? Contact us!

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