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**High Toughness Cermets for Molten Salt Pumps**

# Background

- The corrosion resistance and room temperature mechanical properties of ultra-high toughness cermet materials are being validated for molten metal pump impellers, seals, and bearings.
- These cermet materials combine the best properties of metals and ceramics. Also, because of the manufacturing methods and because no heat treating is required, the cost is estimated to be less than the alternatives.

# Project Objectives

- Validate the application of ultra-high toughness hierarchically designed ceramic-metallic nanocomposite materials for molten metal pumps, as molded components and coatings for operation in molten 750°C KCl-MgCl<sub>2</sub> or MgCl<sub>2</sub>-KCl-NaCl chloride salts.
- Build a small validation pump to be run in a small laboratory salt loop