

WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON

METAL-BASED COMPOSITES AND METHODS THEREFOR

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Inventors: Lianyi Chen, Ali Nabaa

The Invention

UW-Madison researchers have developed a novel approach to effectively wet, incorporate and disperse ceramic nanoparticles into molten metal. The technique is based on rapidly heating the melt to induce boiling, upon which metallic vapors diffuse into gaseous bridges between the nanoparticles in the agglomerates. A mass flux of vapor into a gaseous bridge will increase the pressure and disperse the particles. Simultaneously, local high-pressure zones near the nanoparticle surface will induce condensation of the metal vapor to form a liquid metal coating on the surface of the nanoparticles to enable full wetting. When the rapid heating cycle ends, a rapid cooling process then follows, to assist with vapor condensation on nanoparticle surfaces and fully wet the nanoparticle surface. The rapid heating can be a one-time heating, or cyclic rapid heating and cooling, and would likely be accomplished by induction heating. The heating of flowing molten metal with nanoparticle clusters in a segment of a pipe could be used for continuous casting of metal matrix nanocomposites.

Additional Information

For More Information About the Inventors

- [Lianyi Chen](#)

Tech Fields

- [Materials & Chemicals : Composites](#)
- [Materials & Chemicals : Metals](#)

For current licensing status, please contact Michael Carey at mcarey@warf.org or 608-960-9867

