



## Low Cost Non-Reactive Coating for Refractory Metals

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A non-reactive coating for refractory metals has been developed at The Ames Laboratory. Contamination of rare earth and reactive metals and their alloys has been a chronic problem that results from their interaction with the crucibles or other vessels used in high temperature processing or during other applications. As a consequence, processing and other costs are high due to the need to replace equipment or containers, or the properties of the alloys being produced may be negatively impacted by reacting with the crucible material. To overcome this obstacle, researchers have developed a method for preparing refractory metal carbide coatings that are non-reactive with rare earth metals and alloys, as well as other reactive metals. The thickness of the coatings can be controlled and varied, and they display good adherence and higher melting temperatures than the refractory metal to which they are applied. These non-reactive carbide coatings on the surfaces of refractory metals may thus have utility in high temperature applications (such as, turbines and aircraft engines, crucibles, thermocouple sheaths) or chemically corrosive environments (such as chemical reactors, and oil and chemical processing systems); wear resistant surfaces and other tribological uses; and medical applications (such as, prosthetics and implants).

The technology is currently available for licensing. The benefits of using this technology are that it is: **Versatile** – can be used to coat: (1) the interior/exterior walls of fine tubes; (2) complex shapes [e.g. u-shaped tubes, wire filaments]; (3) objects of various sizes – small to large; **Economical** – coating application is based on a low cost method; **Robust** – material is non-corrosive, exhibits good adhesion, and is hard; and **Environmentally friendly** – material is non-toxic and coated objects can be reused.

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For further information on licensing this technology contact: [licensing@iastate.edu](mailto:licensing@iastate.edu)

For further information on technology transfer opportunities or additional technical information on this technology contact: Debra Covey, Assoc. Laboratory Director, [covey@ameslab.gov](mailto:covey@ameslab.gov) or go to [www.ameslab.gov](http://www.ameslab.gov)



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