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Battelle Number(s):

14185

Patent(s) Issued

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Awards Won:

R&D 100 Award - 2006

Available Technologies

Powder Injection Molding

SUMMARY

Presented here is a novel and innovative means of powder injection molding (PIM) of reactive refractory metals, such as titanium and its alloys, to form components for advanced engineering applications. The process offers the opportunity to create new solid-state formed alloy components in a variety of net or near-net shape geometries and alloys. Because of the nature and composition of the binder system and the relatively small amount used, the binder can be completely removed from the molded component during heat treatment.

Thus, use of a naphthalene based binder system, followed by injection molding and removal of the binder, affords a green body ready for sintering. Sintering affords the titanium article, with no increase in or incorporation of oxygen or carbon. Molding and removal of the binder system are done at 150° C to 250° C, thus using less expensive molds than for other forming techniques.

Tensile strengths are achieved comparable to wrought titanium in the PIM-formed specimens. Chemical and microstructural analyses show that this process does not add oxygen or carbon to the material.



U.S. DEPARTMENT OF
ENERGY

Patents & Intellectual Property

- » Patent #: 7,691,174
- » Patent #: 7,585,348
- » Patent #: 7,585,458

Technology Portfolio(s)

- » Materials Forming, Joining and Deposition

Potential Industry Applications

- » Chemicals

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