Post-doctoral Fellow Position
in the Liquid Metal Infiltration Processing of Composites for Heat Exchangers

A position for a Post-doctoral Fellow working in the area of liquid metal infiltration processing of shaped ceramic/metal composites for heat exchangers is available starting on September 1, 2015 in the research group of Ken H. Sandhage (Reilly Professor of Materials Engineering) in the School of Materials Engineering at Purdue University in West Lafayette, IN. The primary aim of this position is to develop reactive melt infiltration approaches to generate shaped ceramic/metal composites for use as thermally-, mechanically-, and chemically-robust materials for heat exchangers, in order to exceed the peak operational temperatures of current metal alloy-based heat exchangers. The Post-doctoral Fellow will join a multidisciplinary team of researchers at Purdue University, the Georgia Institute of Technology, and the University of Wisconsin focused on the fabrication and testing of advanced heat exchangers for concentrated solar power systems (Fig. 1) for the U.S. Department of Energy (DOE). Key technical tasks of this Post-Doctoral Fellow will include the development of a reactive liquid metal infiltration process for converting porous shaped preforms into dense, near net-shaped ceramic/metal composites of desired phase content. The position will also involve training graduate students, writing publications, making presentations, and preparing reports for DOE. Highly motivated, hardworking candidates with a strong background and good hands-on skills related to the infiltration of liquid metals into porous ceramic preforms, evaluation of liquid metal/ceramic interfacial reactions, and characterization of ceramic/metal composites (including by TEM) are strongly encouraged to apply. Candidates should possess a PhD in metallurgical engineering, ceramic engineering, materials science and engineering, or a closely-related field, with good English skills and a demonstrated ability to write technical articles in English. Qualified applicants should send resumes (with a publication list), 2-3 representative publications, a brief description of career goals and motivation for joining this effort, and contact information (with phone numbers) for 3 referees by e-mail to: khsandhage@gmail.com

Fig. 1. “Power Tower” Concentrated Solar Power (CSP) system. Light from a field of heliostats (mirrors) is concentrated onto a receiver that transfers heat to a high-temperature fluid. The fluid carries heat to a heat exchanger (HEX) or a thermal storage tank. The HEX transfers heat to another fluid to drive a turbine (see also: www.youtube.com/watch?v=QTNU1JHzxA).
Senior Research Engineer Position
in the Liquid Metal Infiltration-based Manufacturing of
High-Temperature Ceramic/Metal Composites for Heat Exchangers

A position for a Senior Research Engineer (SRE) in the area of liquid metal infiltration-based manufacturing of shaped high-temperature ceramic/metal composites for heat exchangers is available starting on September 1, 2015 in the research group of Ken H. Sandhage (Reilly Professor of Materials Engineering) in the School of Materials Engineering at Purdue University in West Lafayette, IN. The primary function of this position is to lead the development of a reactive melt infiltration-based manufacturing process for generating shaped ceramic/molten metal composites for use as thermally-, mechanically-, and chemically-robust materials for heat exchangers, in order to exceed the peak operational temperatures of current metal alloy-based heat exchangers. The SRE will join a multidisciplinary team of researchers at Purdue University, the Georgia Institute of Technology, and the University of Wisconsin focused on the fabrication and testing of advanced heat exchangers for concentrated solar power systems (Fig. 1) for the U.S. Department of Energy (DOE). The key technical tasks of this SRE will include: designing, constructing, and testing cold-wall, inert-atmosphere liquid metal infiltration systems; the development of diffusion bonding protocols for joining metals to ceramics; and evaluating mechanical and thermal properties of the ceramic/metal composites. The position will also involve coordinating and managing the efforts of several postdoctoral research fellows and graduate students, interfacing with research teams at the Georgia Institute of Technology and the University of Wisconsin, writing publications, making presentations, preparing quarterly reports for DOE, developing new research ideas and preparing competitive proposals based on those ideas for federal, state, or industrial sponsors. Highly motivated, hardworking candidates with a strong background, good hands-on experimental skills, and project management experience related to the development of liquid metal infiltration systems, metal-to-ceramic bonding, and the thermomechanical characterization of ceramic/metal composites are strongly encouraged to apply. Candidates should possess a PhD in metallurgical engineering, ceramic engineering, materials science and engineering, mechanical engineering, chemical engineering, or a closely-related field, with good English skills and a demonstrated ability to write technical articles in English. Qualified applicants should send resumes (with a publication list), 2-3 representative publications, a brief description of career goals and motivation for joining this effort, and contact information (including phone numbers) for 3 referees by e-mail to: khsandhage@gmail.com
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