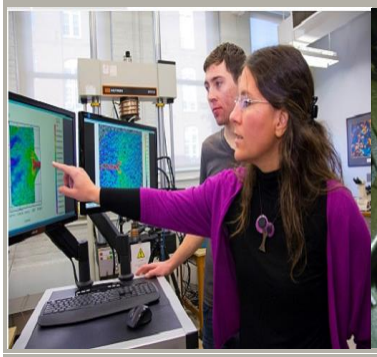
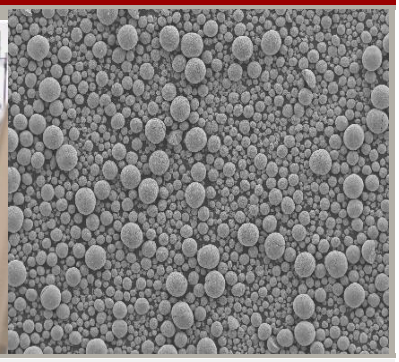
WPI

Materials Science & Engineering
Manufacturing Engineering
Materials Process Engineering

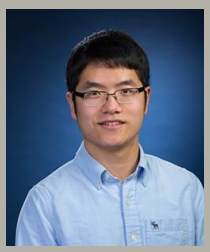




Wednesday November 29, 2017
12pm

Washburn shop #229

Farzaneh (Farrah) Farhadi



Haixuan Yu

MTE Seminar Series

Heat Treat 2017 Presentations

Developing Aluminized coatings on stainless steels by hot dipping

Abstract:
Aluminide diffusion coatings enhance carburization and oxidation resistance of iron and nickel-based alloys by formation of iron and nickel aluminides which extends the life of furnace alloys and fixtures. As a part of a large project in CHTE, an aluminized coating on RA330 was studied by a hot dip process followed by diffusion heat treatment. Samples of RA330 steel were dipped in pure liquid aluminum at 700 °C for 10 minutes. After dipping, four samples were given an additional diffusion treatment. To predict the developed phases, computational analysis was used and the results were compared to the experimental data.

Identification of the important material and process parameters that control distortion and residual stress in heat treatment

Abstract:
A finite element (FE) method was used to determine the important heat treating process parameters that impact the residual stress and distortion in steel. The FE model combines a commercially available heat treatment software DANTE to the finite element analysis software ABAQUS. A thermo-mechanical FE model was developed to model the evolution of microstructure, the volumetric changes associated with the kinetics of martensitic phase transformation and the formation and distribution of residual stress during quenching of steel. Alternative quenching parameter such as different steel grades, quenching orientation, immersion speed, quenching agent, quenching temperature, austenitizing temperature and part geometry were ranked based on their impact. The main purpose of this paper is to provide processing guidelines to control residual stress and distortion.