

Flow Calorimetry Design for Elevated Temperature Experiments with Deuterium and PdZr Nanoparticles

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Abstract

Results from pressurization of chemically reactive nanoparticle metal hydrides with hydrogen gas have shown consistent behavior of a net anomalous heat. With consultation from peers, and from encouraging data, there has been an effort to analyze these experiments with deuterium gas at higher temperatures. The calorimetry for higher temperature experiments is complicated by normal means; therefore, a high temperature calorimetry setup was designed to allow for proper heat transfer measurements of the system. This setup consists of a flow of water around the reactor to which the reaction heat transfers. The change in the water temperature from inlet to outlet can be integrated over time to calculate the total heat released from the reaction. This paper discusses the design of this system and the results that followed.