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Thermal Analysis for U-Mo/Al Dispersion Fuel

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ABSTRACT

A thermal analysis model for U-Mo/Al dispersion fuel during irradiation was developed focusing primarily on interaction layer (IL) growth at the UMo-Al interface, fission gas bubble swelling in the U-Mo and pore growth at the IL-Al interface. The IL growth, fission gas bubble swelling in the U-Mo and the much-larger pore growth outside of the U-Mo are the major contributors for the degradation of fuel meat thermal conductivity. A burnup-dependent fuel meat thermal conductivity was developed. The model was used to predict temperatures for in-pile tested plates to assess the effect of the microstructural changes on thermal properties. IL growth data measured from in-pile test samples were used to benchmark the model, knowing that IL growth is a function of temperature.