P13 STUDY OF THE DENSIFICATION OF URANIUM-ERBIUM SYSTEM

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The sintering process of UO_2-Er_2O_3 pellets has been investigated because of its importance in the nuclear industry and the complex behavior during sintering. The present study includes the development of nuclear fuel for power reactor in order to increase the efficiency of the fuel trough longer refueling intervals. The erbium is indicated for longer cycles, which means less stops to refueling and less waste. In this work, we studied the use of erbium oxide by varying the concentrations in the range of 1-9.8%, which was added to UO_2 powder through mechanical mixing, aiming to check the rate of densification and a possible sintering blockage. The powders were pressed and sintered at 1700°C under hydrogen atmosphere. The results show a sintering blockage in the UO_2-Er_2O_3 system that occurs in the range of 1500-1700°C temperature. Dilatometric tests indicate a retraction of 21.9% when used Er_2O_3 at 1 wt. % concentration. This shrinkage is greater than is observed with higher concentrations or even without the addition of the burnable poison, providing us with a better degree of incorporation of the element erbium, resulting in pellets with density suitable for use as nuclear fuel.

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P58 DETERMINATION OF SCALING FACTORS TO ESTIMATE THE RADIONUCLIDE INVENTORY OF WASTES FROM THE IEA-R1 RESEARCH REACTOR

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Regulations for transfer and final disposal of radioactive waste require that the inventory of radionuclides for each package enclosing such waste must be estimated and declared. In this work, the scaling factor methodology was applied successfully to estimate the inventory of radionuclides in spent ion-exchange resins and spent activity level, from the IEA-R1 nuclear research reactor. Scaling factors or correlation functions were obtained linking the activity concentrations of 15 difficult to measure nuclides with two gamma-ray emitting key nuclides, reducing exposure to ionizing radiation, contamination risks and operational costs.
