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RECOVERY EFFICIENCY OF ZR ACCORDING TO PARTICLE SIZE OF BAF2 FROM WASTE PICKLING ACID SOLUTION OF ZR CLAD TUBE

Wan-Bae Kim, Seong-Hun Lee, Young-Jun Lee and **Jong-Hyeon Lee**
Chungnam National University, Republic of Korea

In order to manufacture Zr cladding, several pilgering and intermediate heat treatment processes are required. During these processes, tube surface contaminated by lubricant as well as oxide layers is cleaned by a mixed hydrofluoric and nitric acids. As the number of pickling process increases, the pickling efficiency decreases since Zr solubility in the pickling acid decreases. As a result, the pickling solution requires frequent replacement. The spent pickling acid is conventionally neutralized by using caustic soda (NaOH), followed by an evaporation concentration and finally disposed. Hence, the conventional waste treatment process has inherent problem that the rare metal Zr dissolved in the spent pickling solution can't be recycled. This study investigates an environmentally benign recycling method for Zr as well as the spent pickling acid that involves adding BaF2 to spent pickling acids to produce Ba2ZrF8 through chemical precipitation without neutralization. In particular, a particle size analyzer, FE-SEM, EDX, ICP, and XRD analysis was utilized to evaluate the Zr recovery efficiency according to the particle size of BaF2 which is used as a precipitant and the characteristics of the precipitates. As a result of experimentation, the Zr concentration in the recovered pickling acid was found to be 127 ppm when the particle size of the BaF2 used as a precipitant is 500 nm or lower, and the concentration of residual Ba in the pickling solution was less than 100 ppm.

BIOGRAPHY

Wan-Bae Kim has studied at Chungnam University, Republic of Korea. His major is Electroreduction and Electrorefining. He has studied at the Department of Materials Science and Engineering and Nanomaterial process laboratory of prof. Jong-Hyeon Lee.

dhksqo07@cnu.ac.kr

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