

Zirconium and Hafnium Tetrachloride Separation by Extractive Distillation with Molten Mixture of NaCl-KCl (8:29M)

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Zirconium alloys have been used for fuel cladding in nuclear industry due to the combination of their low thermal neutron capture cross-section, good corrosion resistance in high temperature water. Since the starting materials for the production of zirconium and hafnium metal by Kroll process, the separation of ZrCl₄ and HfCl₄ mixture has been investigated under high pressure condition to obtain pure zirconium tetrachloride. However, technical difficulties at the required high pressures prevented the process from becoming commercially feasible. In this study, the development of an extractive distillation operation under ambient pressure is highly desirable. The results of the simulation carried out on ASPEN HYSYS simulator with the hypothetical components are presented. The beneficial performance of using molten salt in extractive distillation has been demonstrated through the total cost reduction compared with the high pressure operation.

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