

Recovery of Boron as Homogeneous Perborate Particles from Synthetic Wastewater by Integrating Chemical Oxo-Precipitation with Fluidized-Bed Homogeneous Granulation

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Abstract : Among current techniques of boron removal from wastewater with high boron concentration, chemical oxo-precipitation (COP) is one of the promising methods due to its milder condition. COP uses H₂O₂ to transform boric acid to perborates which can easily precipitate with barium ions at room temperature. However, the generation of the waste sludge that requires sludge/water separation and sludge dewatering is troublesome. This work presents an innovative technology which integrates chemical oxo-precipitation (COP) with fluidized-bed homogeneous granulation (FBHG) to reclaim boron as homogeneous perborate particles. By conducting COP in a fluidized-bed reactor, the barium perborate can be granulated to form homogeneous particles (>1.0 mm) with low water content (< 10%). Under the suitable condition, more than 70% of boron can be recovered from 600 ppm of boron solution and the residual boron is lower than 100 ppm.

Keywords : barium, perborate, chemical oxo-precipitation, boron removal, fluidized-bed, granulation

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