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Effective Utilization Process for the Adsorbent with Nitrate Prepared from Bittern

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Summary

Nitrate contamination of surface and groundwater is one of the main problems associated with agricultural activities in many part of the world, and there is an urgent need to develop effective materials and process for efficiently removing excess nitrate from aquatic environment. On the other hands, bittern is one of the resources from seawater to be desired for a new utilization.

In this study, we attempted to synthesize the adsorbent with high removal performance for nitrate from bittern with addition of cheap agent, $FeCl_3$, and its nitrate removal performance was examined.

The product including Mg-Fe-layered double hydroxide (LDH) with nitrate removal can be synthesized from bittern with addition of $FeCl_3$ ($(Mg^{2+} + Ca^{2+})/Fe^{3+} = 3$) within 30 min at 50 ^{o}C with keeping pH 9.5. The product has higher selective removal ability for nitrate in monovalent anion solution than in divalent anion solution. With decreasing the temperature of nitrate solution, nitrate removal performance of the product is higher and slower.