Boron-Selective Sorbents from Dendritic Nanomaterials

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Desalination of seawater is a promising approach to supply coastal areas with clean water for human consumption and agriculture. Boron concentrations in seawater range from 0.5 to 5 mg/L. While boron is an essential nutrient for plants, its overdose can adversely impact their growth. For example, boron concentrations above 0.3 mg/L can cause serious damage to citrus crops. Although conventional seawater reverse osmosis (SWRO) desalination systems have very rejection for salts (>95%), their rejection of small and neutral compounds such boric acid is poor (~30%). Because of this, 1-2 additional RO passes with high pH adjustment (~9) are often used in SWRO desalination plants to produce water with acceptable boron concentration (<0.3 mg/L). Thus, there is a great need for more efficient and cost effective post-treatment systems to remove boron from the permeate streams of SWRO desalination plants. This poster will discuss the synthesis and characterization of a new generation of boron-selective sorbents. We show that dendritic nanomaterials provide ideal building blocks for the synthesis of high capacity and selective sorbents for removing boron from saline water.