# Preparation of basic yttrium carbonate for phosphate removal

## ABSTRACT

Removal of phosphate ions from aqueous solutions has been studied with basic yttrium carbonate (BYC) of different compositions prepared by homogeneous precipitation with yttrium chloride and urea. Higher carbonate content was obtained with higher concentration of urea. Removal of phosphate was significant at pH less than 12 and dependent on the composition of BYC. The possible mechanism for removal is ion exchange with carbonate or hydroxide groups between pH 7 and 12 and through complex formation of phosphate with yttrium ions and ion exchange between pH 2 and 6. The phosphate adsorption capacity of BYC prepared with a higher concentration of urea was higher than that of BYC prepared with a lower urea concentration. The removal of phosphate followed a Langmuir model. The BYC of higher carbonate content gave higher percentage removal in the pH range of 6 to 11. The high phosphate adsorption capacity of the compound can be attributed to its carbonate group content and surface area. The phosphate adsorption was not affected by Fī , SO4 2ī , NO3 ī , Brī , and Iī in the basic pH range.

**Keyword:** Adsorption; Nutrient removal; Phosphorus; Yttrium carbonate