Application of zirconium phosphonate—a novel hybrid material as an ion exchanger

Brijesh Shah, Uma Chudasama*

Applied Chemistry Department, Faculty of Technology & Engineering, The M. S. University of Baroda, Vadodara, Gujarat 390 001, India
Tel. 0265 2434188 Extn. 212; Fax: ± 91 265 2423898; email: uvcres@gmail.com

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ABSTRACT

In the present endeavour, zirconium amino tris(methylenephosphonic acid) (ZrATMP)—a novel hybrid ion exchange material of the class of tetravalent metal acid (TMA) salts has been synthesized by sol gel method. Physico-chemical and instrumental methods of analysis [Elemental analysis (ICP-AES, CHN analysis), FTIR, TGA, XRD and SEM] have been used to characterize the material. Cation exchange capacity (CEC) has been determined and the distribution behaviour of metal ions Co²⁺, Ni²⁺, Cu²⁺, Zn²⁺, Cd²⁺, Hg²⁺, Pb²⁺, Ce³⁺ and Th⁴⁺ in aqueous and various electrolyte media/concentrations determined and confirmed with breakthrough capacity values.

Keywords: Tetravalent metal acid salt; metal phosphonate; zirconium phosphonate; hybrid ion exchanger; cation exchanger; metal aminophosphonate

*Corresponding author.