



“Gheorghe Asachi” Technical University of Iasi, Romania



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## ADSORPTION BEHAVIOR OF GADOLINIUM(III) FROM AQUEOUS SOLUTION BY D418 RESIN

Leilei Pi<sup>1</sup>, Chunhua Xiong<sup>1\*</sup>, Jianxiong Jiang<sup>2</sup>, Xuming Zheng<sup>3</sup>, Rongrong Zhao<sup>1</sup>, Caiping Yao<sup>1</sup>, Qing Chen<sup>1</sup>, Yaqin Fu<sup>4</sup>, Yaofeng Zhu<sup>4</sup>

<sup>1</sup>Department of Applied Chemistry, Zhejiang Gongshang University, No.149 Jiaogong Road, Hangzhou City, Zhejiang Province, 310012, China

<sup>2</sup>Key Laboratory of Organosilicon Chemistry and Material Technology of Ministry of Education, Hangzhou Normal University, Hangzhou City, Zhejiang Province, 310012, China

<sup>3</sup>Engineering Research Center for Eco-Dyeing & Finishing of Textiles, Ministry of Education, Zhejiang Sci-Tech University, Hangzhou City, Zhejiang Province, 310018, China

<sup>4</sup>School of Materials and Textile, Zhejiang Sci-Tech University, Hangzhou City, Zhejiang Province, 310018, China

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### Abstract

The adsorption, desorption, and kinetics behaviors of Gd(III) ion on chelating resin were investigated. Batch adsorption studies were carried out with different pH, contact time, and temperature. The adsorption of Gd(III) follows the Langmuir model better than the Freundlich model. The apparent activation energy  $E_a$  and adsorption rate constant are  $k_{308}$  4.16 kJ/mol and  $6.01 \times 10^{-5} \text{ s}^{-1}$ , respectively. Thermodynamic parameters such as  $\Delta H$ ,  $\Delta S$  and  $\Delta G$  indicated that Gd(III) ion adsorption by D418 resin was an endothermic and spontaneous process in nature. Column adsorption experiments indicated the maximum dynamically adsorption capacity of 281mg/g for Gd(III). The desorption rate of Gd(III) was 98.3% when the elution agent is 2.0 mol/L HCl solution and the chelating resin can be regenerated and reused. Analysis of IR spectroscopy for D418 resin before and after adsorption of Gd(III) ions and after desorption indicated the attendance of coordination and good regenerative ability of resin. Thermo gravimetric analysis for D418 resin before and after adsorption of Gd(III) ions proved the adsorption of Gd(III) ions.

**Key words:** adsorption, desorption, D418 resin, Gadolinium(III)

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\* Author to whom all correspondence should be addressed: e-mail: xiongch@163.com; Phone: +86 0571 88071024-7571