Study on structural characterization and algae-removing efficiency of polymeric aluminum ferric sulfate (PAFS)

Huaili Zheng, Zhenzhen Jiang*, Junren Zhu, Mingzhuo Tan, Li Feng, Liwei Liu, Wei Chen

Key Laboratory of the Three Gorges Reservoir Region’s Eco-Environment, State Ministry of Education, Chongqing University, Chongqing 400045, China
Tel. +86 23 65120827; Fax: +86 23 65121769; email: livelyzeng@126.com

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ABSTRACT

Polymeric aluminum ferric sulfate (PAFS), as a novel inorganic coagulant, was prepared through direct oxidation process using industrial by-product ferrous sulfate heptahydrate (FeSO₄·7H₂O) and industrial aluminum oxide (Al₂O₃ content of 16%) as the main materials. PAFS was characterized by Fourier transformed infrared spectrophotometer, scanning electron microscopy, and X-ray diffraction. The coagulation mechanism and molecular conformation of PAFS were analyzed and the different conditions of flocculation effect were investigated in the paper. In order to test the coagulating performances of PAFS, traditional coagulants such as polymeric ferric sulfate, polymeric aluminum chloride, and polymeric aluminum ferric chloride were used to carry out the comparison tests on algae removal efficiency. The results show the removal efficiency for turbidity and chlorophyll a using PAFS were 92.8 and 95.3%, respectively, which were higher than those of the traditional coagulants.

Keywords: Polymeric aluminum ferric sulfate; Direct oxidation process; Structural characterization; Algae removing

*Corresponding author.