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## **PREPARATION OF NEW INORGANIC POLYMER FLOCCULANT AND ITS APPLICATION IN OILY SLUDGE**

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### **Abstract**

Sodium silicate, iron sulfate, magnesium sulfate, and zinc sulfate were used as the raw materials to prepare a new inorganic polymer flocculant, polysilicate ferric magnesium zinc (PSFMZ), using direct recombination. The effects of molar ratio of zinc to silicon, ratio of iron to magnesium, reaction temperature, and reaction time on deoiling rate were explored. The optimal synthesis conditions for the flocculant for the thermal-washing treatment of oily sludge were determined. Results showed that when the added amount of flocculant was 40 mg/L, the deoiling rate of oily sludge reached 82.83 %, which was higher than those obtained when using polyaluminium chloride, sodium silicate, and on-site flocculant. Thus, the prepared flocculant was effective. Scanning electron microscopy analysis showed that when the flocculant was added to the oily sludge, the microstructure of the sludge particles became flat and compact. Consequently, the sludge was effectively flocculated and oil molecules were successfully removed. Thermal analysis showed that crude oil and free water in the oil sludge were largely removed by treatment with thermal washing with polysilicate metal flocculant.

*Key words:* deoiling; inorganic polymer flocculant; oily sludge; polysilicate metal polymer

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