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# Application of lead flocs fractal dimension by new poly-ferric-silicon coagulant

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**ABSTRACT**

Poly-ferric-silicon, made by the fly ash extract, is well in dealing with the lead industrial wastewater. Meanwhile combed with the application of fractal theory in coagulation, the test is conducted the jar test in different dosages and pH value, and found that the fractal dimension of flocs and the lead removal after precipitation can be showed a good correlation, so this is achieved the online monitoring the coagulation effect by flocs fractal dimension. Additionally, in order to assure the optimal hydraulic condition of the new type poly-ferric-silicon coagulant, the test is utilized orthogonal experiment to seek the best hydraulic energy consumption allocation scheme which is $G_1 = 67.7\ s^{-1}$, $t = 3$ min, $G_2 = 57.8\ s^{-1}$, $t = 5$ min, $G_3 = 23.9\ s^{-1}$, $t = 7$ min by dividing the stirring intensity ($G$ value) and stirring time ($t$ value) into different three gears in flocculation stage. and got the appropriate flocs fractal dimension being 1.48, 1.66 and 1.80 in each stage of the distribution of energy consumption. So combing the energy consumption allocation scheme with fractal dimension, it not only be effectively illustrated the rational of the energy consumption allocation decision, but also offered the comparatively scientific design data for designing of the flocculation tank, being made the water treatment economical and efficient.

*Keywords*: Poly-ferric-silicon coagulant; Industrial wastewater with lead; Lead flocs fractal dimension; Energy distribution

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