



## Flocculation performance evaluation and flocculation mechanism study of PAC/PMAPTAC composite flocculant in dyeing wastewater

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### ABSTRACT

In this paper, the inorganic–organic composite flocculant (PAC/PMAPTAC) was prepared with polyaluminum chloride (PAC) and the self-made PMAPTAC. Then, the flocculation sedimentation experiment was used to evaluate the flocculation performance of single flocculant PAC, PMAPTAC and the composite flocculant PAC/PMAPTAC in dyeing wastewater. At the same time, the flocculation effect of PAC/PDMDAAC was compared with that of PAC/PMAPTAC under the same condition. Finally, the flocculation mechanism was analyzed by zeta potential and floc morphology. The results showed that compared with PAC, the flocculation performance of composite flocculant PAC/PMAPTAC could be markedly improved, resulting in the higher decolorization rate and COD<sub>Mn</sub> removal rate. Besides, the increase of ( $\eta$ ) or content of PMAPTAC in PAC/PMAPTAC could enhance the decolorization rate and COD<sub>Mn</sub> removal rate simultaneously. Furthermore, the lower dosage was required to achieve the best removal effect, which meant that the cost of the flocculant was reduced. Moreover, the comparison of flocculation performance turned out that the decolorization rate and COD<sub>Mn</sub> removal rate of PAC/PMAPTAC were higher than those of PAC/PDMDAAC under the same condition. Finally, the zeta potential and floc morphology analysis showed that the flocculation mechanism of the reactive dye simulated wastewater was mainly charge neutralization and adsorption bridging. The above results not only fill the gaps in the research of PAC/PMAPTAC during the treatment of dyeing wastewater, but also provide an experimental basis for its application in dyeing wastewater and expand the application fields of PMAPTAC.

*Keywords:* PMAPTAC; Polyaluminum chloride; Composite flocculant; Dyeing wastewater; Flocculation mechanism

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