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Development of montmorillonite-supported nano CaO₂ for enhanced dewatering of waste-activated sludge by synergistic effects of filtration aid and peroxidation

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Abstract: Nanosized CaO₂ was first synthesized using montmorillonite clay layers as templates for combining the positive effects of filtration aid and peroxidation on the dewatering of waste-activated sludge (WAS). Exchangeable Ca²⁺ compensating for negative charges of montmorillonite reacted with the added H₂O₂, affording nano CaO₂ on the surface or in the interlayer regions of montmorillonite (montmorillonite-supported nano CaO₂, MMT-nano CaO₂). The catalytic capacity of montmorillonite for generating ·OH from nano CaO₂ was verified by electron paramagnetic resonance (EPR), therefore, the radical oxidation induced by MMT-nano CaO₂ can destruct the floc structure of WAS with the omission of Fe (II), the conventionally used catalyst for Fenton reaction. As a result, the reduction in specific

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