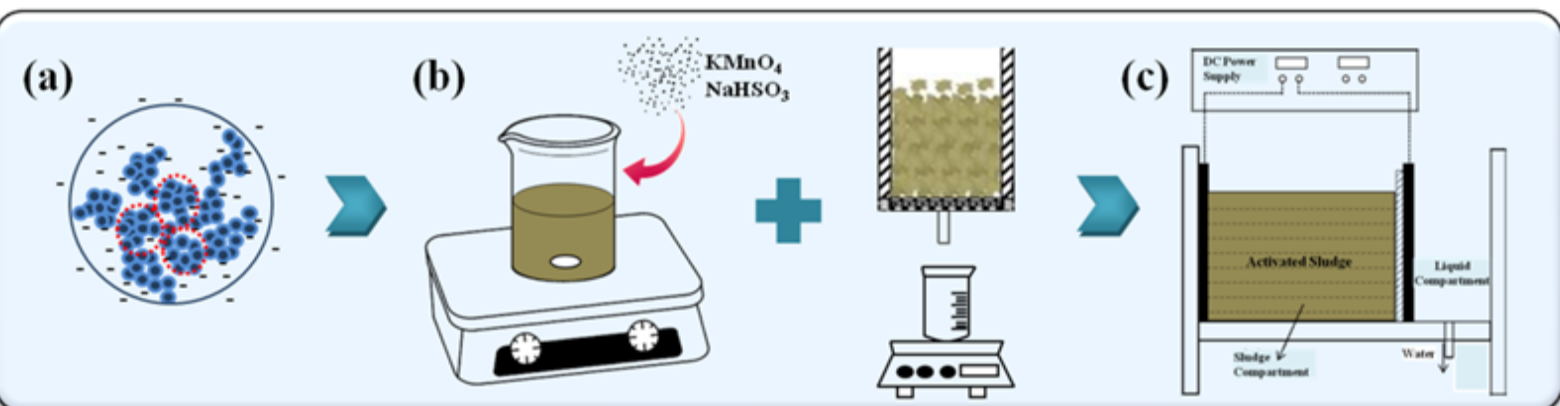


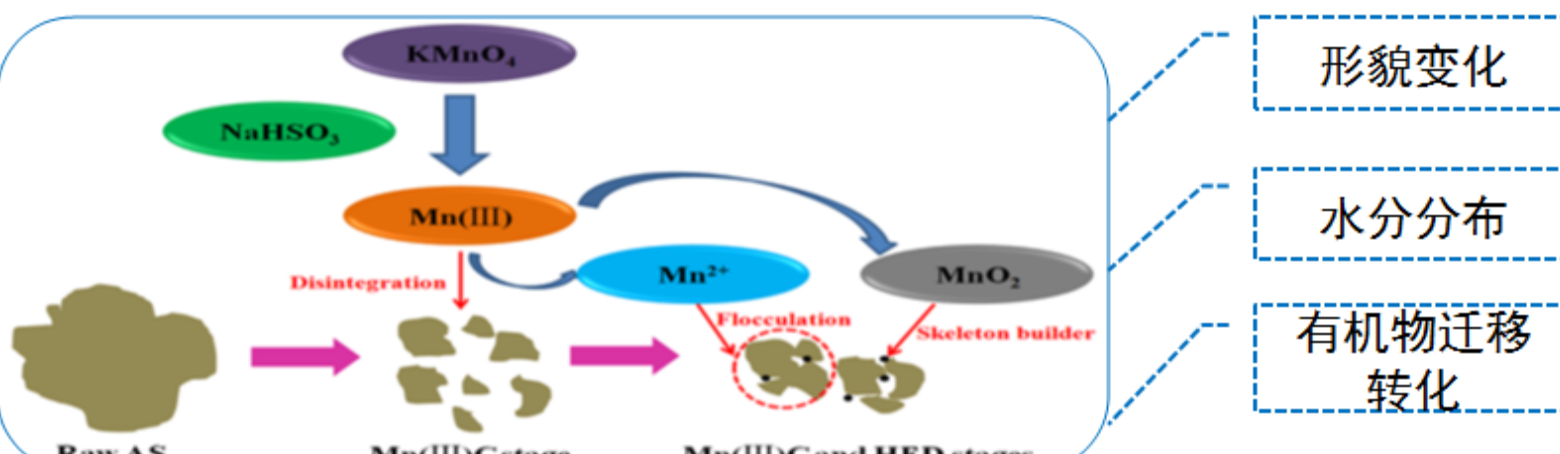
污泥高效调理脱水技术与城市污水处理厂尾水深度除磷技术

◆ 污泥Mn(III)调理-电脱水联用工艺

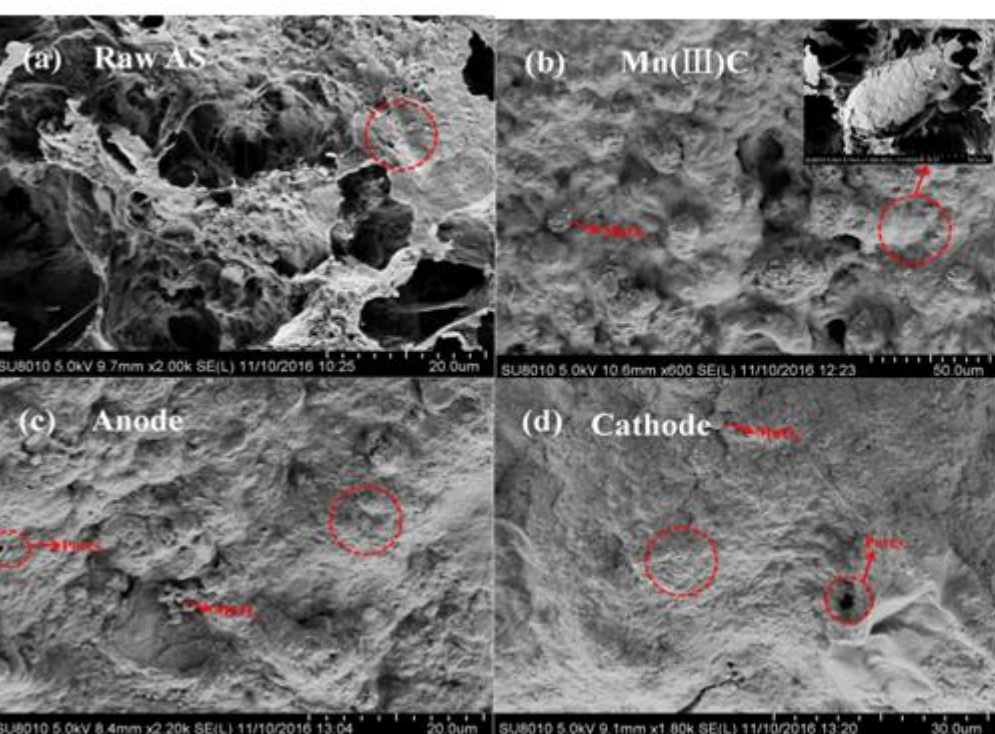
■ 污泥的Mn(III)调理-电脱水工艺



优化条件，确定KMnO₄投加量为0.74 mmol/g DS，NaHSO₃的投加量为3.70 mmol/g DS，电压20 V，电脱水作用时间120 min。



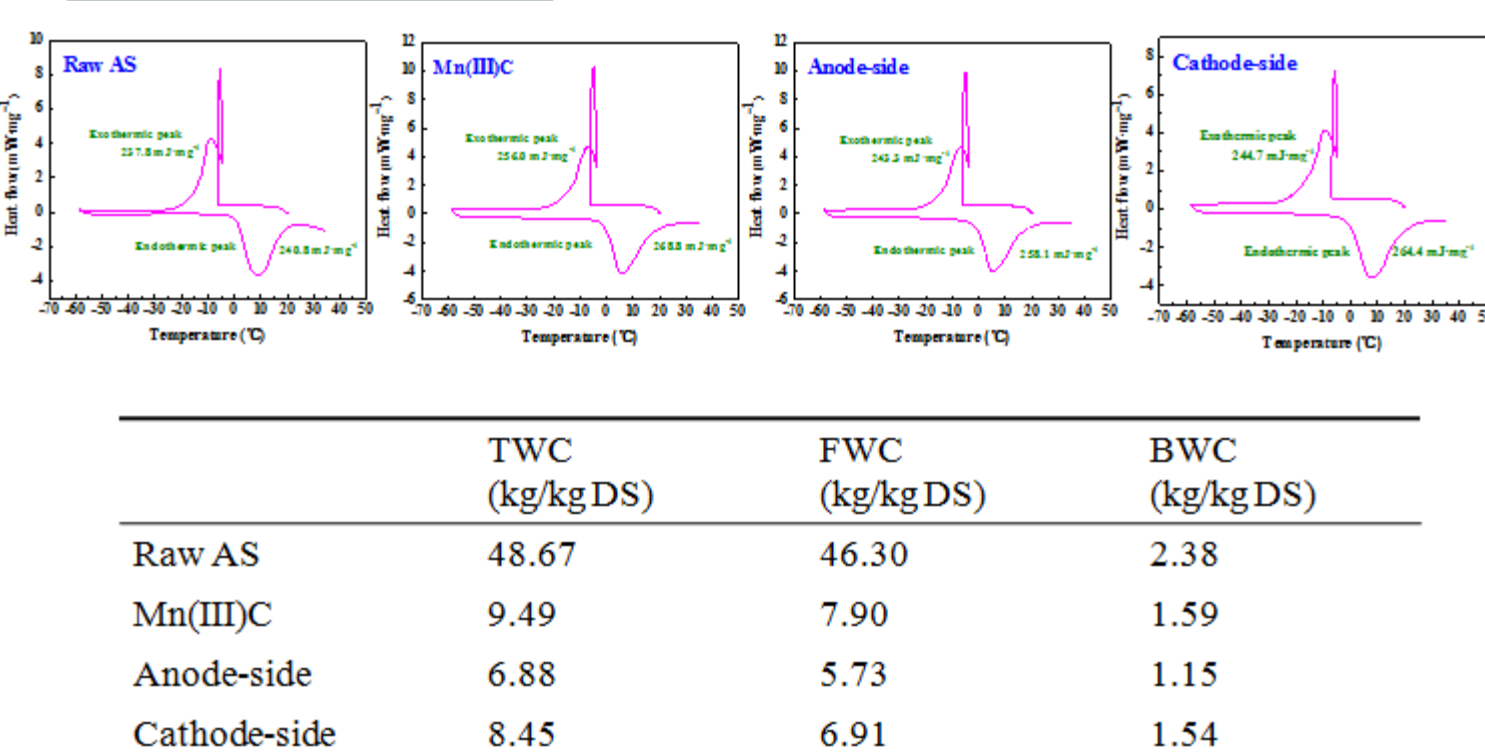
■ 污泥的形貌结构



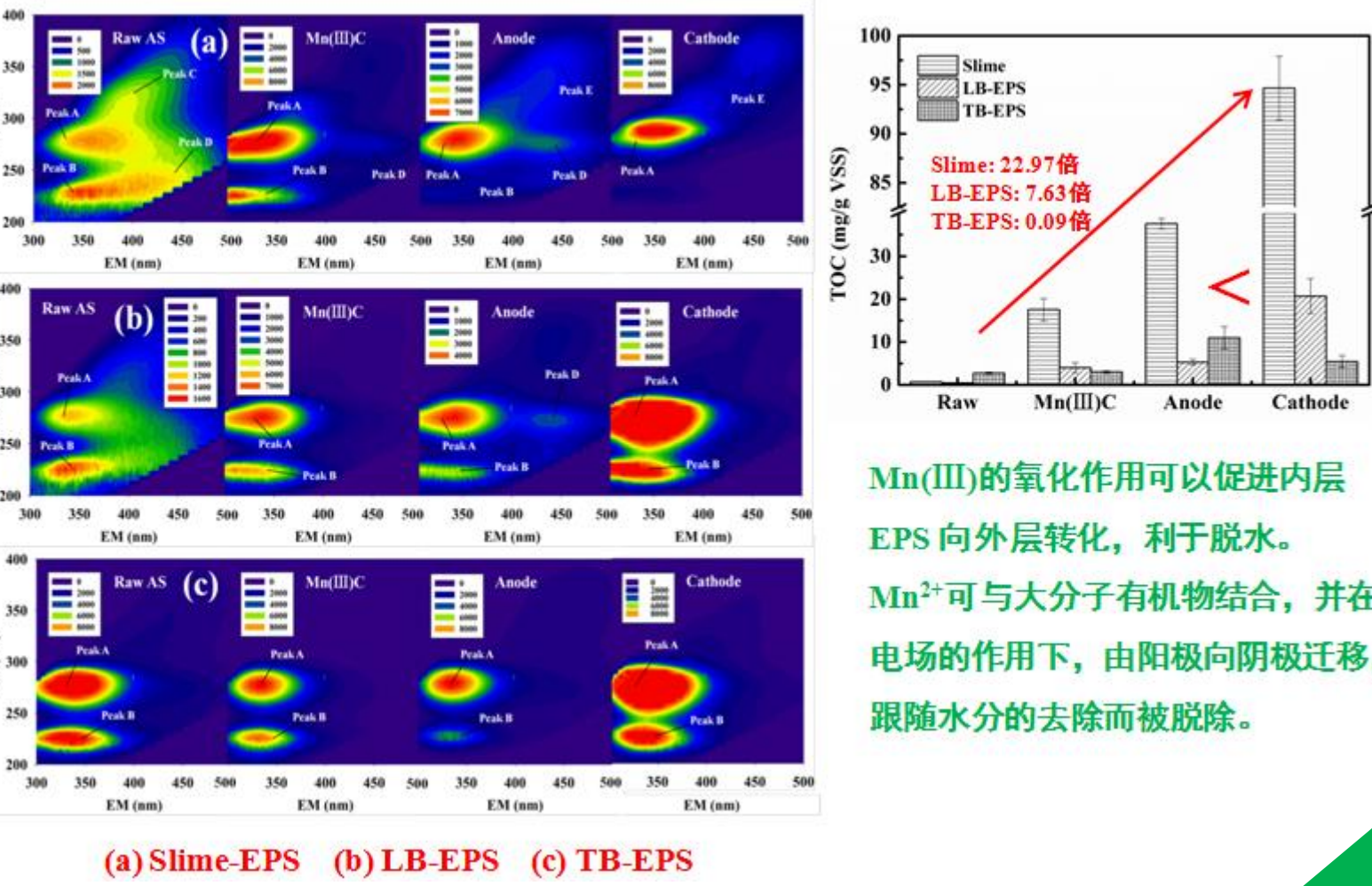
经过Mn(III)调理，污泥表面变得光滑、致密。微生物细胞被破碎。

水平电场脱水后，污泥表面都变得粗糙，并且非常致密。

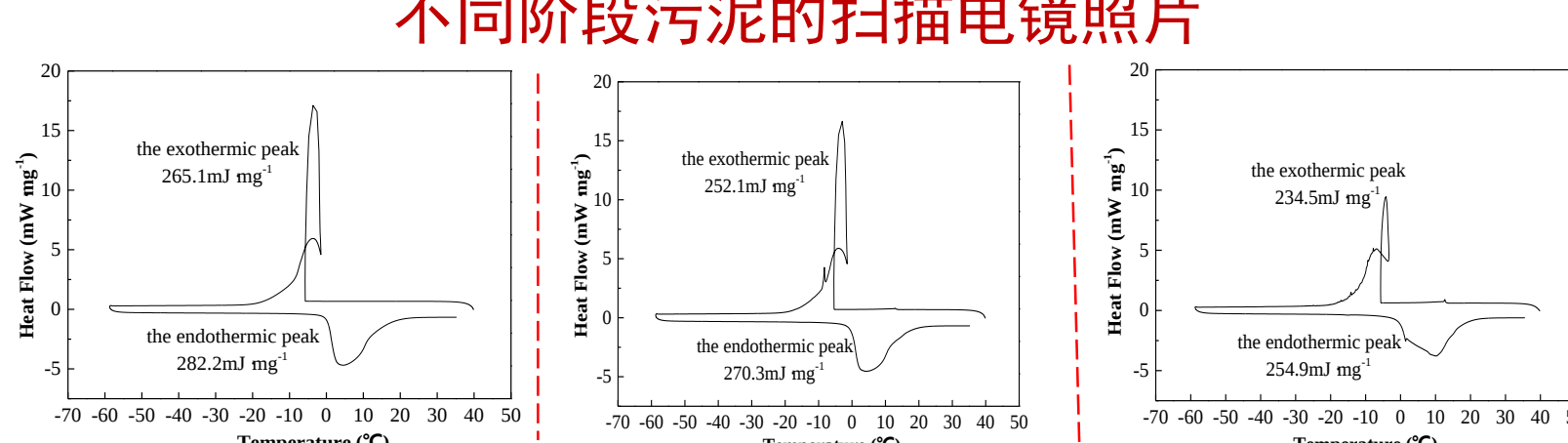
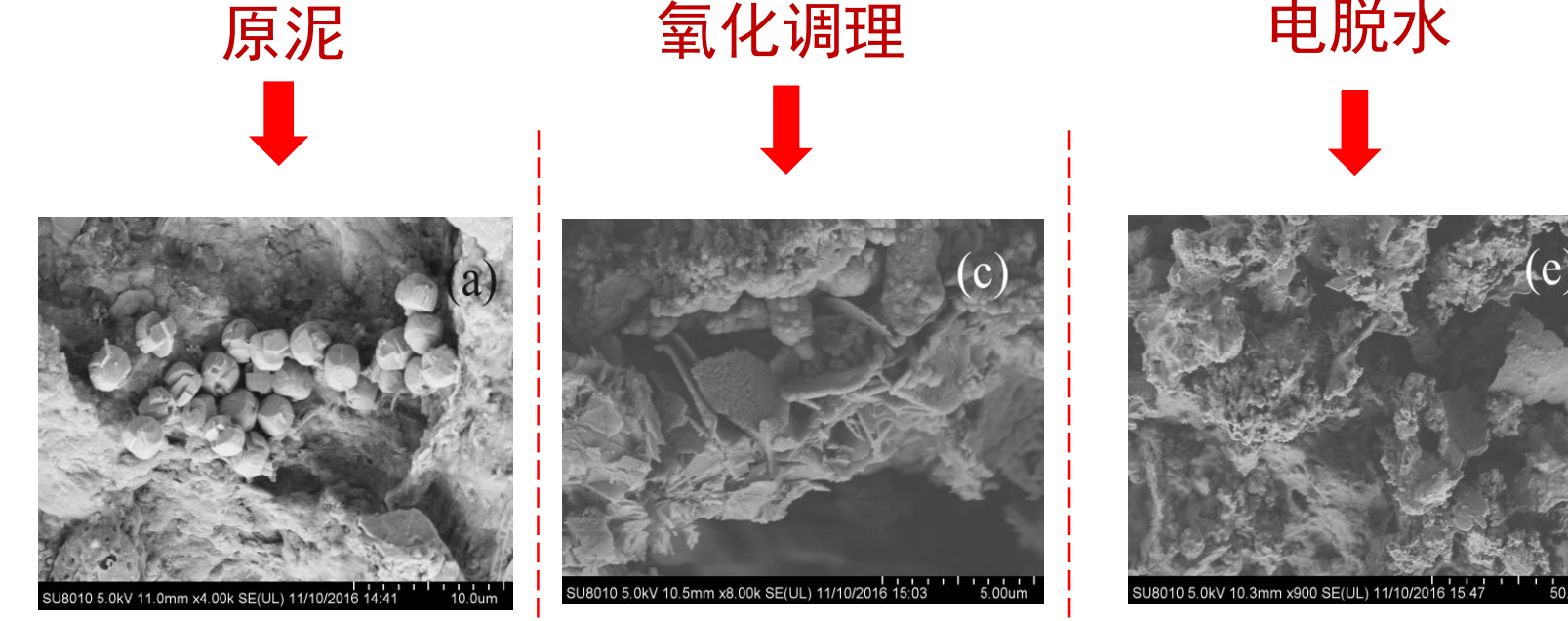
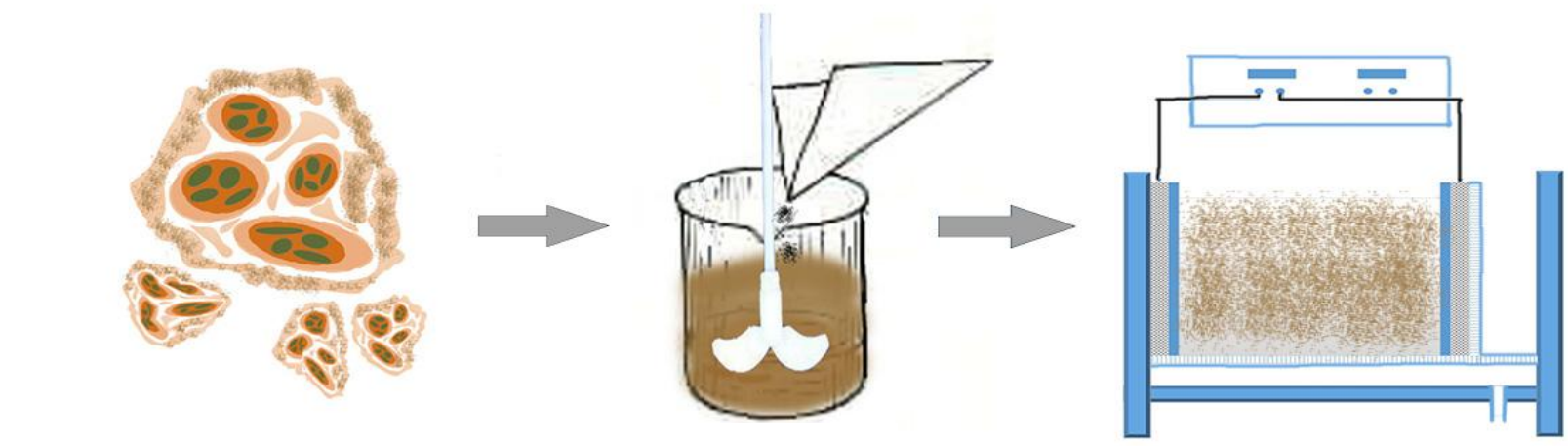
■ 污泥的水分分布



■ 污泥中的有机物迁移转化



◆ 污泥ZVI/PS-HED高效调理-电脱水工艺



不同阶段污泥的扫描电镜照片

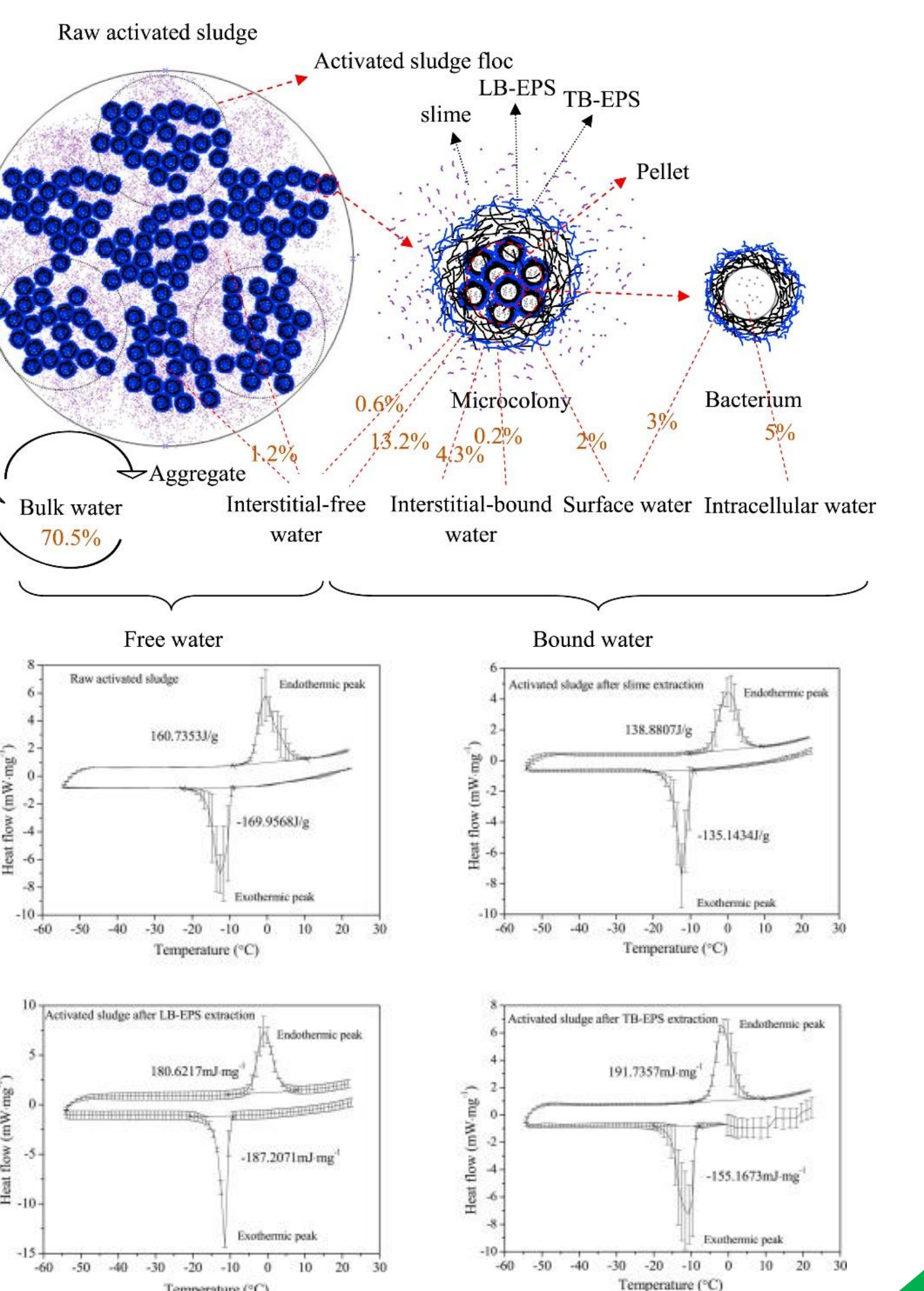
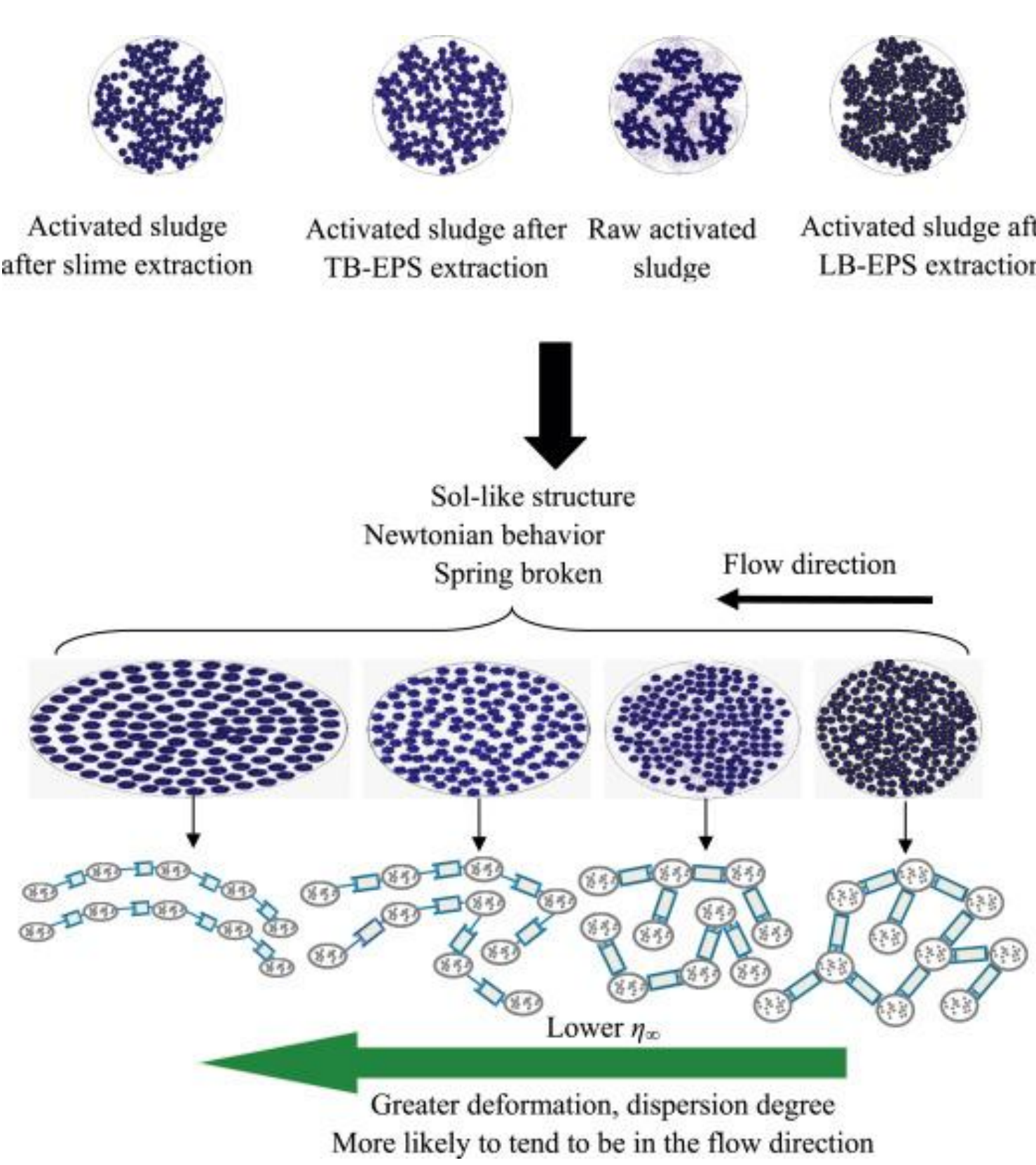
不同阶段污泥的差热分析

➢ ZVI/PS-HED处理火星污泥，最终含水率可降至83.67%

➢ 束缚水含量在调理和脱水阶段分别下降了24.60%和79.78%

➢ 调理阶段中铁离子的絮凝有利于后期的电渗作用，从而增强了电脱水效果

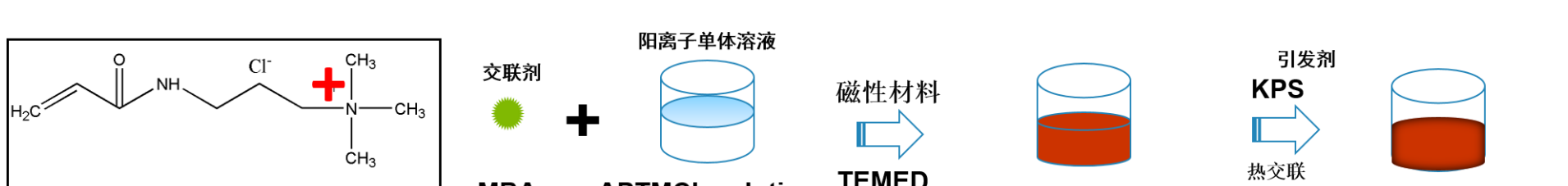
◆ 污泥EPS与水分分布及Gel-like流变模型



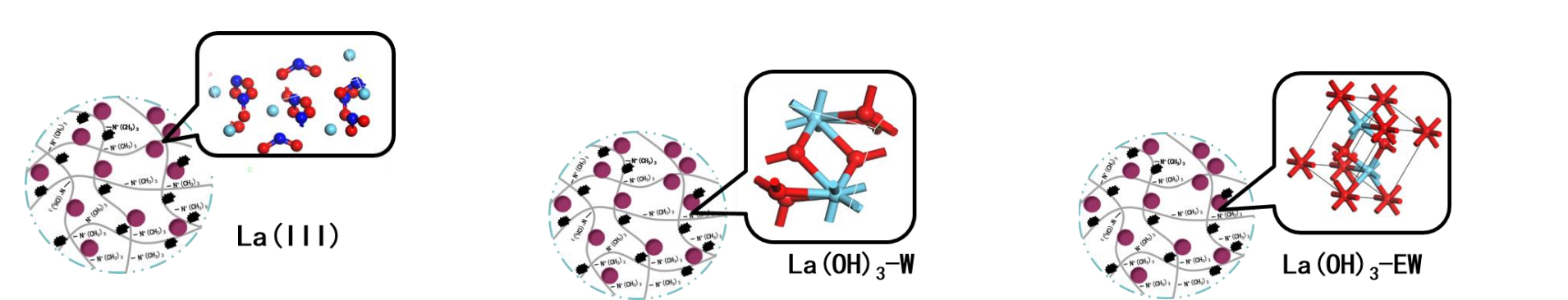
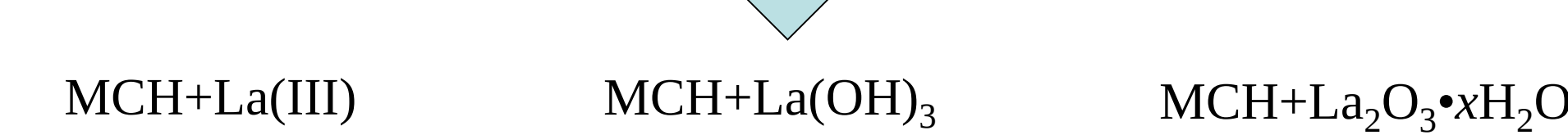
◆ 用于城市尾水深度除磷吸附材料研发

稀土金属改性磁性阳离子水凝胶吸附材料的研发

➢ 铜改性磁性阳离子水凝胶的制备

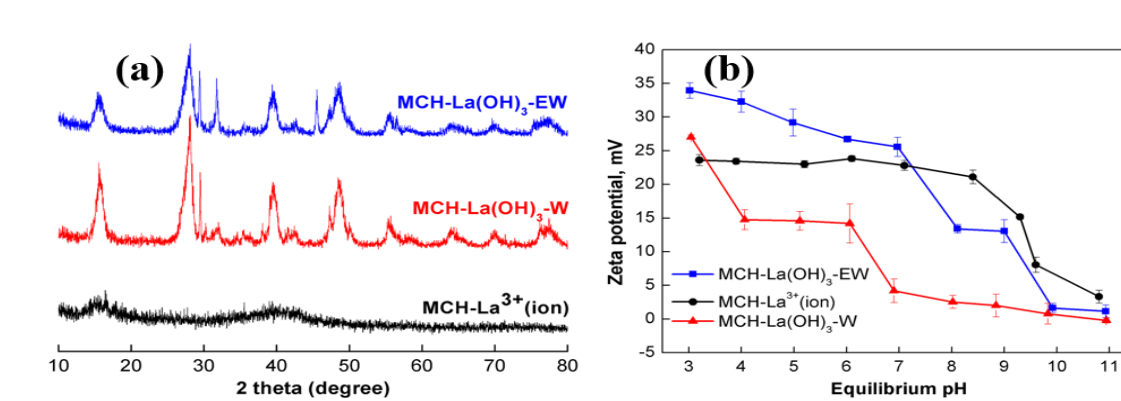


以MCH为载体 活性组分改性

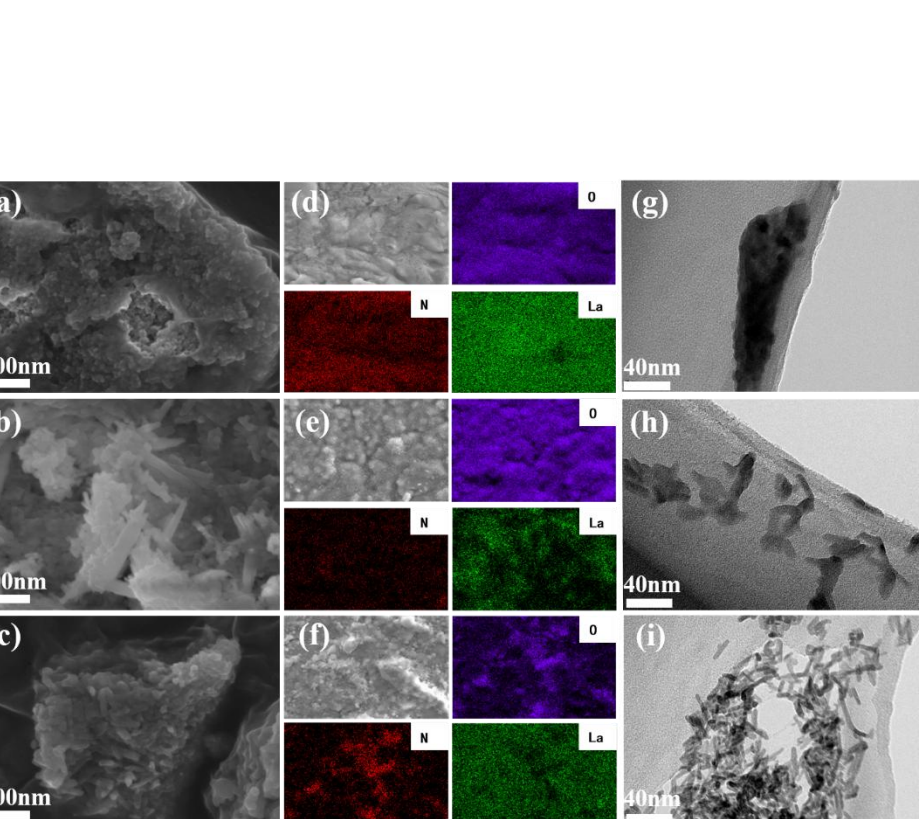


➢ 不同形态铜改性磁性阳离子水凝胶的理化特征

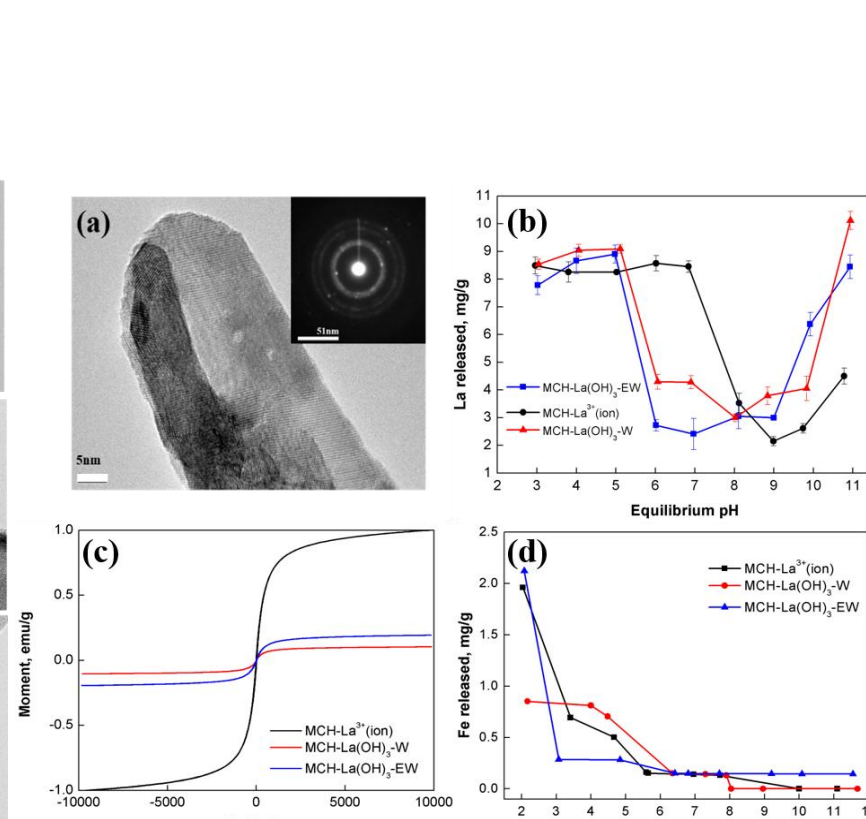
□ 晶体结构特征



□ 表面形貌特征

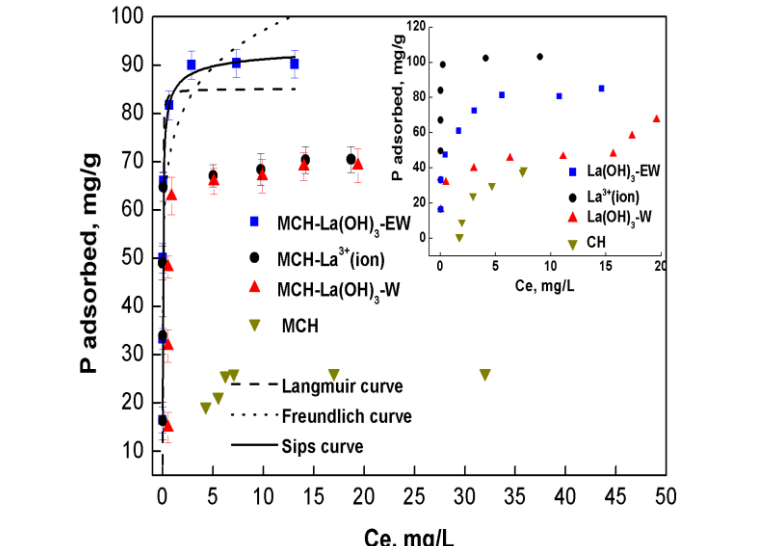


□ 化学稳定特性

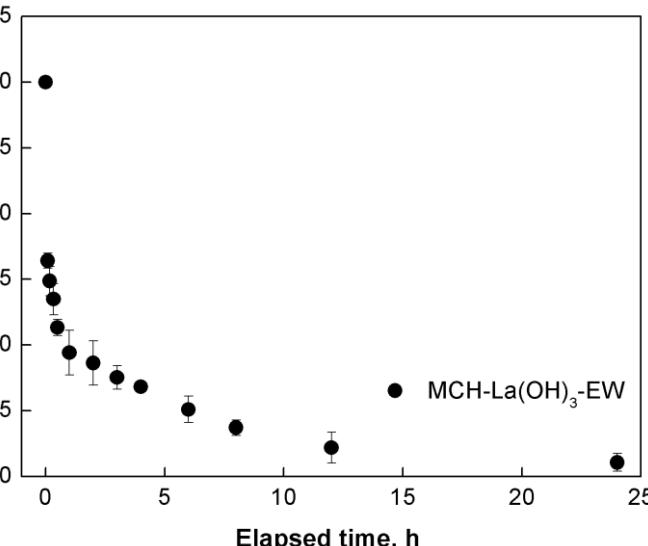


稀土金属改性磁性阳离子水凝胶吸附剂除磷吸附过程与机理

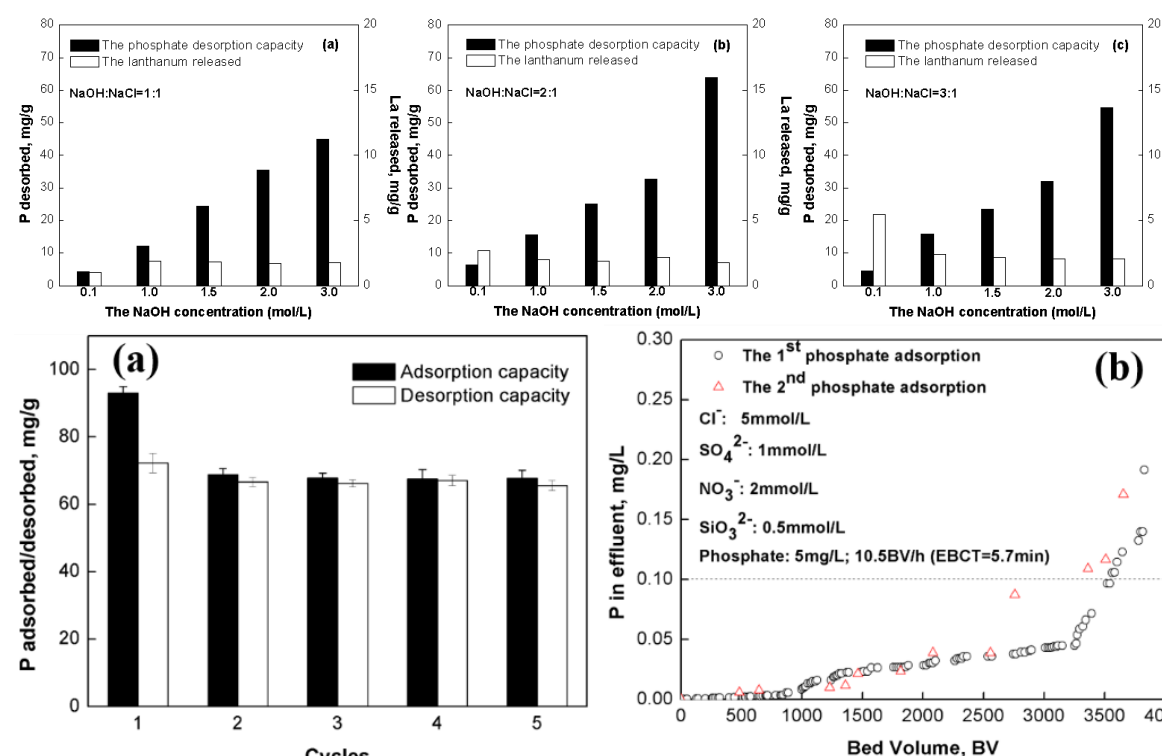
➢ 改性前后除磷吸附量对比



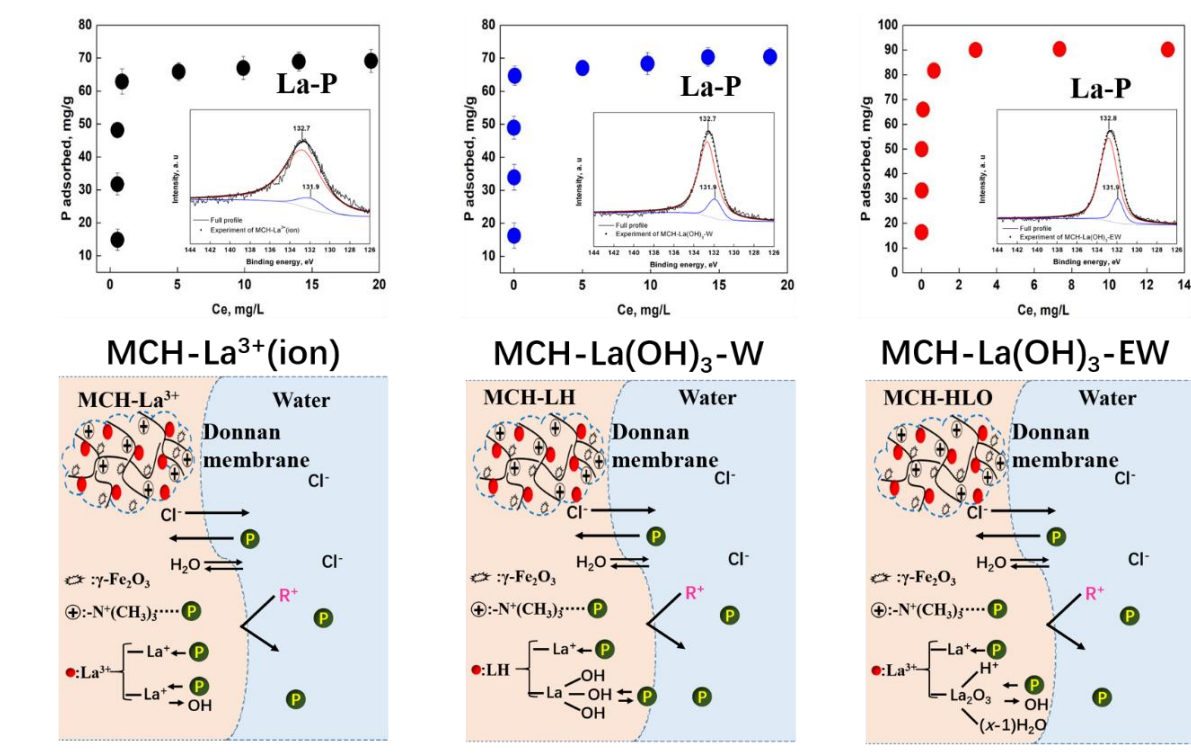
➢ MCH-La(OH)₃-EW吸附除磷特征



➢ 再生循环及动态吸附评价



➢ 吸附机理探讨



◆ 铜改性后的磁性阳离子水凝胶对水中磷酸根的吸附量最大达到90.2mg/g。

◆ 该磁性阳离子水凝胶材料易于磁回收，脱附回用方便，5次脱附再生后吸附量稳定在初始吸附量的72%左右，动态柱实验表明，将5mg P/g的初始浓度降低到0.1mg P/g的动态容量为3500BV。

◆ 吸附机理涉及离子交换、静电作用以及专属吸附多种过程。

阶段性成果:

- Dong, S., Wang, Y*, Zhao, Y., Zhou, X., Zheng, H., 2017. La³⁺/La(OH)₃ loaded magnetic cationic hydrogel composites for phosphate removal: Effect of lanthanum species and mechanistic study. *Water. Res.*
- Guo, X., Wang, Y*, Wang, D., 2017. Permanganate/bisulfite (PM/BS) conditioning-horizantal electro-dewatering (HED) of activated sludge: Effect of reactive Mn(III) species. *Water. Res.*
- Li, H., Wang, Y*, Zheng, H., 2017. Variations of moisture and organics in activated sludge during Fe₀/S₂O₈²⁻ conditioning-horizantal electro-dewatering process. *Water. Res.*
- Yuan, D., Wang, Y*, Qian, X., 2017. Variations of internal structure and moisture distribution in activated sludge with stratified extracellular polymeric substances extraction. *Int. Biodeterior. Biodegrad.*
- Hu, Y., Wang, Y*, 2017. Study on the dewatering process for water treatment residuals: Applicability of freezing-thawing, compression, and electro-osmotic treatment. *Drying Technol.*