


## 阴离子型聚丙烯酰胺相对分子质量和水解度对污泥脱水性能影响的研究

### Effect of anionic polyacrylamide on settleability and dewaterability of sewage sludge

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英文关键词: [sewage sludge](#) [settleability](#) [dewaterability](#) [anionic polyacrylamide\(PAM\)](#) [extracellular polymeric substance\(EPS\)](#)

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中文摘要:

通过对污泥絮凝颗粒粒径分布、污泥比阻、泥饼含固率、上清液体积及其中核酸、蛋白质和总糖浓度的测定,研究了不同剂型和剂量阴离子型聚丙烯酰胺(PAM)对城市污泥沉降性能和脱水性能的影响及机制.结果表明,当PAM相对分子质量相同时,提高水解度能改善污泥的沉降和脱水性能;当PAM水解度相同时,提高相对分子质量亦可改善其沉降和脱水性能,但当相对分子质量高达1200万时,沉降和脱水性能反而下降.研究筛选出最佳阴离子型PAM剂型为相对分子质量800万、水解度20%的PAM,其次是相对分子质量600万、水解度30%的PAM,且最佳投加量均为 $75 \text{ mg} \cdot \text{L}^{-1}$ .结果还发现,当PAM相对分子质量相同时,提高水解度能增大上清液蛋白质及糖类浓度,而当PAM水解度相同时,提高相对分子质量亦可增大上清液蛋白质及糖类浓度,但当相对分子质量提高到1200万时,上清液蛋白质及糖类的浓度反而下降,表明污泥表面胞外聚合物(EPS)的脱落是阴离子型PAM改善污泥沉降和脱水性能的主要原因之一.

英文摘要:

The effect of anionic polyacrylamide (PAM) with different molecular weight (MW) and hydrolysis degree (HD) on the settleability and dewaterability of sewage sludge was evaluated by determining the particle size distribution, specific filtration resistance and cake solid content of flocculated sludge as well as the supernatant volume, and concentrations of DNA, protein and sugar in the supernatant of sewage sludge. Addition of anionic PAM increased the percentage of particles with diameter greater than 0.60 mm, while it decreased the percentage of particles with diameter less than 0.25 mm. The increase in the HD of PAM with the same MW led to a rise of the supernatant volume, but a decline in the specific filtration resistance. For PAM with the same HD, the supernatant volume increased with the MW from 6 to 8 MDa, but decreased with a further increase of MW to 12 MDa. The response of specific filtration resistance to the MW of anionic PAM was opposite to that of supernatant volume. The effective application dosage of PAM for optimal settleability and dewaterability varied with the type of PAM. The optimal settleability and dewaterability were obtained at  $75 \text{ mg} \cdot \text{L}^{-1}$  for PAM with MW of 6 MDa and HD of 30%, and for the PAM with MW of 8 MDa and HD of 20%. It was also found that both the elevated HD of anionic PAM with the same MW and the elevated MW of anionic PAM with the same HD could induce an increasing concentration of protein and sugar in the supernatant of sewage sludge, implying that the release of extracellular polymeric substance (EPS) from the sludge surface was one of the main reasons for the improvement of settleability and dewaterability associated with PAM addition.

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