

No. 0904

Development of a Pre-Treatment Method for High Performance Waste Water Treatment Using NaCl

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Summary

We investigated the possibility of pre-treatment method for waste water treatment by addition of NaCl solution to suspensions which can make small particles in suspensions into larger size flocs. We compared the properties of sediments formed from slurries with different type and concentration of salts. In general, inorganic salts have been used as coagulant which can make both of the surface charge of a particle and the length of electric double layer small, resulting in particle coagulation. Therefore, salts with high-valence cations are usually preferable which can make particles coagulated even by small additive amount. However, the sediments formed from slurries with these salts have lower particle concentration, thus, the efficiency of solid-liquid separation must be quite low. In addition, the sediments also show poor flowability because particles in the sediment connects strongly each other due to strong particles' interaction, which means that the sediments are difficult to transport by pump.

On the contrary, sediments formed from slurries with NaCl have relatively high particle concentration and good flowability. Although the additive amount of NaCl should be higher than other salts with high-valence cations, the NaCl concentration needs to make particles coagulated is almost same or below the NaCl concentration in sea water. From these results, the pre-treatment method by addition of NaCl solution has possibility to improve the efficiency of solid-liquid separation, especially for dynamic filtration.