

THE EFFECT OF SUPERFLOC N-300 ON THE SEDIMENTATION OF Pb(II) HYDROXIDE

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Due to general toxicity and mutagenicity, the concentration of Pb(II) compounds is strictly limited in wastewater which discharged into municipal sewage systems (MPC 0.1-0.05 mg/dm³), and for discharging into reservoirs and drinking water MPC ≤ 0.03 mg/dm³[1].

In galvanic processes, the most widely used method is the precipitation of Pb(II) hydroxide with calcium hydroxide. The precipitation of Pb(II) hydroxide, which is thus formed in the fine-dispersed state is slowly precipitated and has a high moisture capacity. It reduces the efficiency of cleaning and complicates the recycling process. To improve the purification efficiency, it is advisable to use flocculants, which at concentrations (2÷5) mg/dm³ significantly increase the size of the aggregates Pb(II) hydroxide, which reduce the settling time [2-3].

The wastewater model is a solution of Pb(II) nitrate with a lead concentration of 2.0 g/dm³. The slurry of calcium hydroxide «lime milk» with a concentration of 50 g/dm³ has been used for the precipitation of Pb(II) hydroxide. The precipitation of Pb(II) hydroxide has been performed by the Jar test method. The rapid stirring step after the injection of a solution of calcium hydroxide in Pb(II) nitrate was being carried out by a frame stirrer with a rotation speed of 240 min⁻¹ for 5 minutes. The next slow stirring step has been performed by reducing the stirring speed to 60 min⁻¹ for 10 minutes. The obtained slurry of hydroxide Pb(II) hydroxide was completely poured into a cylinder for the sedimentation.

The SUPERFLOC N-300 flocculant (2-5) mg/dm³ was injected into the slurry at the beginning of slow stirring. The preparation of the slurry of Pb(II) hydroxide occurred at a molar ratio of Pb(II):2OH⁻ = 1.01. WAGA TORISNA WTW torsion scales with a weighing interval of 30 sec has been used to research the sedimentation process.

It was found that the increase in the influence on the sedimentation of the slurry of Pb(II) hydroxide SUPERFLOC N-300 demonstrates in the range of its concentrations (1-5) mg/dm³. At concentrations above 5 mg/dm³, its effect on the sedimentation rate of the slurry is practically unchanged.

The partition of the particles of the slurry of Pb(II) hydroxide without using SUPERFLOC N-300 and with SUPERFLOC N-300 revealed that in the absence of flocculant the main fractions of the particles have sizes (3.8-5.9) μm - 47.6% and (5.9-10) μm - 38.1%. When injected into a slurry of Pb(II) hydroxide 5 mg/dm³ SUPERFLOC N-300 aggregate size significantly increases (12-19) μm - 30.5%, (19-33) μm - 20.1%, (75-110) μm - 9.5%.

Thus, it has been found that the SUPERFLOC N-300 flocculant increases the size of Pb(II) hydroxide aggregates and can be recommended to improve the effluent treatment of galvanic industries.

References:

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