

**Guminska, J. Effect of Changes in Al Speciation on the Efficiency of Water Treatment with Pre-hydrolyzed Coagulants. *Ochrona Srodowiska* 2011, Vol. 33, No. 2, pp. 17–21.**

**Abstract:** The efficiency of pre-hydrolyzed coagulants at removing natural organic matter (NOM) from water is influenced by the extent to which they have been hydrolyzed, by the type of the pollutants being removed, and the conditions under which the coagulation process is conducted. Ferronometry tests have revealed that upon the addition of polyaluminum chlorides (PAC11, PAC12 and PAC13) the change in the content of monomeric species (Al1) was insufficient to exert an influence on the efficiency of the coagulation process, irrespective of the pH applied. However, the pH of the water was found to be a factor that affected the mechanism of the process and was strongly influenced by the characteristics of the coagulants, as well as by the mode of NOM occurrence in the water. Over the pH range of 4.8 to 5.0, the products obtained from the hydrolysis of high-polymerized coagulants practically contained aluminum in dissolved form; when the coagulants being hydrolyzed included a high proportion of monomers, the hydrolysis products contained aluminum not only in dissolved but also in precipitated form. During coagulation in this pH range, PAC13 was found to be the most efficient among the reagents tested. Coagulation conducted over the pH range of 7.5 to 7.9 failed to provide optimal conditions for the removal of organic matter since no difference was observed in the efficiency of water treatment between the coagulant with the highest and the coagulant with the lowest proportion of polymerized aluminum. The dominating mechanism that governed NOM removal under such conditions was the mechanism of sweep coagulation.

**Keywords:** Coagulation, pre-hydrolyzed coagulants, polyaluminum chloride, natural organic matter, transformation of Al species.