Guminska, J., Klos, M. Analyzing the Consequences of Pre-hydrolyzed Coagulant Overdosage. *Ochrona Srodowiska* 2011, Vol. 33, No. 3, pp. 15–18.

Abstract: Coagulation with aluminum sulfate is associated with the potential risk of overdosing on the coagulant, which leads to a reduction in the efficiency of mineral organic matter and dissolved organic compound removal, as well as to an increase in the residual aluminum content of the treated water. No such effects have been observed so far in the case of overdosing on pre-hydrolyzed alum coagulants. However, laboratory tests involving particle counters have revealed that an excessive dose of a coagulant which contains the products of its hydrolysis induces the formation of a large number of fine particles (<5 μm) in the water. On the other hand, the results of turbidity measurements performed upon coagulation and sedimentation were not indicative of overdosage. To determine the form of these particles, ferronometry tests were conducted, which enabled Al species analysis. The problem of pre-hydrolyzed coagulant overdosage was analyzed based on the measurements performed in a surface water treatment plant where conventional coagulation is conducted with a highly-polymerized coagulant. Water quality analyses after particular unit processes have demonstrated that despite the high treatment efficiency (measured using standard procedures) the number of particles in the water was highly variable. This variability was concomitant with periods when residual aluminum occurred in excess and, owing to the form of occurrence, could not be measured with standard methods. Aluminum speciation analysis (based on the values of the reaction rate constants and the measured values of UV absorbance; λ=370 nm) has shown that residual aluminum then occurred predominantly in the form of polymer Al_{13}.

Keywords: Pre-hydrolyzed coagulant, overdosage, particle counter, Al species analysis.