

**Molczan, M. Influence of Swelling Phenomenon on MIEX<sup>®</sup> Ion Exchange Resin Dose Accuracy. *Ochrona Srodowiska* 2013, Vol. 35, No. 2, pp. 9–13.**

**Abstract:** Swelling of ion exchange resins depends on solvation of functional groups and tendency to reach equilibrium between internal and external ionic solutions. These phenomena lead to changes in volume of an ionite portion. Sedimentation time of a fresh MIEX<sup>®</sup> powdered resin in demineralized water was experimentally estimated at approximately 5 min. Therefore, any shorter time should definitely not be used for the ionite dose measurements. It has been proven that solution type used to prepare the resin suspension affects the ionite volume as a result of variations in its swelling. 3.5% increase in resin volume was determined after switching from demineralized water to model solution containing composition of dissolved organic and inorganic constituents. Therefore, in order to obtain a fixed reference value only resin suspension in demineralized water should be applied when calculating a dose (especially, when comparing different study results). Progressing resin saturation resulted in change in the volume of a certain ionite portion. Swelling increase was being observed until ionite load corresponding to the bed volume of 400 cm<sup>3</sup>/cm<sup>3</sup> was reached, and then it stabilized. At that point an increase in the ionite volume was 15% when compared to the value for the fresh resin in demineralized water and about 11% when compared to the initial resin volume in the model solution containing natural organic substances. The maximum swelling was reported at the relatively small ionite load, therefore the degree of swelling of a resin working in a typically loaded reactor is expected to be constant. The impact of swelling on the measured doses of fresh resin and on the corresponding amounts of saturated resin should be considered not only in experiments but also while exploiting powdered resins in the ion exchange process.

**Keywords:** Water treatment, ion exchange, powdered resin, MIEX<sup>®</sup> resin, swelling, bed volume, NOM removal.