# Dissolution Kinetics of Used Aluminum Can in Isopropyl Alcohol for Aluminum Isopropoxide

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A kinetic study of dissolution reaction of Al can waste was conducted for the synthesis of aluminum isopropoxide (AIP). With the used Al can and isopropyl alcohol (IPA) as reactants, the reaction was examined at the condition of 3mol IPA/mol Al of stoichiometric ratio, adding 10-3mol HgI2/mol Al and no agitation at the reaction temperature ranging from 70 to 82℃. After 17 hours, the reaction gave a 75% yield. A two-stage dissolution mechanism was proposed in which the dissolution rate is determined first by a chemical reaction and then by ash layer diffusion. On the basis of the shrinking core model, the chemical reaction rate equation on the shape of Al can was established: XA=kc x int (1-XB)dt. By using the arrhenius expression, the apparent activation energy of the first chemical reaction step was determined to be 92.4kJmol-1. In the second stage, the dissolution rate controlled by diffusion control through the ash layer. The rate equation was established to XA^2=kA x int (1-XB)dt. The apparent activation energy of the second step was determined to be 174.9kJmol-1.