

Measurement of Total Surface Acidity of Silica-Alumina Catalyst by a Modified Tamele Method using Di-n-butylamine as a Titrant

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Abstract — In the original Tamele method (Amine titration method) n-butylamine has been used as a base (titrant) and benzene as a solvent. Since benzene is considered to be carcinogenic and nbutylamine is a toxic organic compound, attempt has been made to replace both of these two compounds for measuring the surface acidity of silica-alumina solid catalysts. For this purpose amorphous silica-alumina catalysts having three different silicon/aluminum ratios were prepared. Prior to carrying out the amine titrations, the solid catalyst samples were activated at 450°C. In the titrimetric method benzene was replaced by cyclohexane, n-hexane and n-heptane and n-butylamine by di-n-butylamine. The parameters varied were concentration of di-n-butylamine solution, sample size of catalyst and type of catalyst samples. It was observed that the total surface acidity of silica-alumina catalyst could be measured using a dilute solution of di-n-butylamine in cyclohexane or n-hexane or n-heptane. The total surface acidity of all the catalyst samples were found to be greater when cyclohexane was used as a solvent. A modified Tamele method has, therefore, been suggested replacing benzene with cyclohexane as the solvent and di-n-butylamine as the titrant.
