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- 曾宇
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硅沸石完美骨架上的吸附Ⅱ.乙胺、正戊烷、乙醇在 **FAU**型沸石上的吸附热

曾宇,钱斌,王静,龙英才

复旦大学化学系.上海(200433)

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摘要 用测定吸附等温线法研究乙胺、正戊烷和乙醇在疏水高硅FAU沸石上的吸附热效应。根据Clapeyron-Clausius方程，处理吸附等温线，得到不同覆盖度C(C=被吸附分子数/晶胞)的等量吸附热Qst(C)(一定覆盖度C时由Clapeyron-Clausius方程计算的吸附热)及平均等量吸附热Qst^*(一定温度区间里等量吸附热Qst的平均值)，以及Qst^*与沸点蒸发热△Hv的差值△H1(定义为相互作用强度△H1=Qst^*-△Hv)。所研究的三种有机分子的△H1的次序为△H1(乙胺)>△H1(正戊烷)>>△H1(乙醇)。这与AT值(定义为脱附温度Td与吸附质的沸点温度Tb的差值，无需单位)有正相关关系。由AT值观察到的高硅FAU沸石Si-O骨架与被吸附乙胺之间可能存在的强相互作用、为本研究测定的热力学定量数据△H1值所证明。

关键词 吸附 等量吸附热 乙胺 戊烷 乙醇 高硅沸石 吸附等温线 吸附热

分类号 0642

Adsorption on siliceous zeolites with perfect framework Ⅱ. adsorption heat of ethylamine, n-pentane and ethanol on FAU zeolite

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Fudan Univ, Dept Chem.Shanghai(200433)

Abstract The adsorption heat of ethylamine, n-pentane and ethanol was measured based upon the determination of adsorption isothemis at different temperatures on high silica FAU type zeolite with perfect Si-O framework. Calculated with Clapeyron - Clausious equation, the isosteric heat of adsorption Qst (C) (adsorption heat at certain coverage, which is defined as the numbers of adsorbed melecules per unit cell) and average isosteric heat of adsorption Qst^* (the average adsorption heat with various coverage determined in a certain temperature range) were obtained for the adsorbates investigated. △ H1-the difference of Qst^* and △Hv(the heat of vaporization of certain adsorbate), was defined as interaction strength for characterizing the interaction between Si-O framework of the zeolite and the adsorbed organic compound. The order of △H1 for the adsorbed organic compounds is as follows: △ H1(ethylamine)>△H1(n-pentane)>>△ H1(ethanol), which is consistent with the order of AT value (affinity index, was defined as AT=Td-Tb, where Td is the temperature of the weight loss peak of the DTG curve, and Tb is the boiling point of a certain adsorbate). The strong interaction between Si-O framework and the adsorbed ethylamine, which was observed from the desorption behavior on FAU zeolite, is thermodynamically proved in this study by the high interaction strength of △H1(ethylamine) determined quantitatively.

Key words ADSORPTION ETHYLAMINE PENTANE ETHANOL HIGH SILICA ZEOLITES ADSORPTION ISOTHERM ADSORPTION HEAT

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