Hae-Sung Kim

A Kinetic Study on Calcium Alginate Bead Formation

Ca-Alginate-Gel is one of the most widely used carriers for cell entrapment. Since gel formation can take place under mild conditions, entrapment in this matrix is very suitable for immobilization of viable cells and it has found most extensive application. Despite of the extended use there have been no kinetic data related to gel formation of alginate with calcium ion. In the present work the kinetic study was accomplished to more fully elucidate the transient structure transformations involved in the gel formation using shrinking-core model. The proposed kinetic model may be successfully extended to account for the transient behavior and complete gelling time as well as some useful information of the gelling conditions in the process of Ca-Alginate-Gel.

Jong Rack Sohn, Hyang Ja Jung and Hae Won Kim

Catalytic Activities and Acid Strengths of NiO-ZrO₂
Catalysts Modified with Acids

A series of NiO-ZrO₂ catalysts were prepared by co-precipitation from the mixed aqueous solution of nickel chloride-zirconium oxychloride, and were modified with acids, H₂SO₄, H₃PO₄ and H₃BO₃. It was found that the NiO-ZrO₂ catalyst containing 25 mole percent of nickel oxide and evacuated at 400°C for 1.5 hr showed maximum catalytic activities for 1-butene isomerization and ethylene dimerization. The catalytic activities for both isomerization and dimerization were correlated with the acid strengths of the catalysts. The isomerization activity of 1-butene ran parallel with the dimerization activity of ethylene, although the isomerization took place on relatively weak acid sites as compared with the dimerization.

Hoo Kun Lee, Myeong Soo Jeong, Joo Wan Park, Hyun Soo Park and Jong Hyun Cho

Absorption of NO₂ in Packed Column (II)
—Comparison of Experimental with Theoretical—

An absorption efficiency of packed column removing nitrogen oxides with water and NaOH solution under atmospheric pressure was studied. The efficiency and the acidity produced by absorption of NO₂ were measured in a packed column. The model developed that was based on the mass-transfer information for packed column and absorption mechanism accompanying the chemical reaction was compared with experimental results. Predictions using the model presented by the previous paper (part I) was shown well to agree with from the experimental results (part II). The efficiency of NO₂ absorption is largely dependent on the height of packing material and the partial pressure of NO₂ in the feed gas. The efficiency of NO₂ absorption decreases with the increase of the acidity produced by recycling of water as a scrubber liquid. For the recycle mode with an aqueous NaOH solution as a scrubber liquid, NO₂ absorption efficiency is shown to be constant until all of the C<sub>OH⁻</sub> in the scrubber liquid are converted into C<sub>H⁺</sub>.

Kang Ho Yoon, O Ok Park and Jong-Duk Kim

Birefringence Measurement of the Liquid Crystal by Phase Modulation Technique

A convenient and accurate technique for measuring the birefringence of liquid crystal (LC) is developed. The birefringence of LC was obtained with only one experimental run by using phase modulation technique, which is an expansion of PMFB (Phase Modulated Flow Birefringence) technique developed elsewhere [1]. The basic principle of the method is based on the determination of the phase differences which occur when a phase modulated monochromatic polarized light propagates through a medium with an anisotropic refractive index. Birefringence measurements with red light (wavelength: 0.6328 µm) for commercial liquid crystal material (Merck, ZLI