**Sonochemical Synthesis of Large Molecules in Aqueous Benzene Solutions**

Shirai, Yoji; Hatanaka, Shin-ichi; Hayashi, Shigeo
The University of Electro-Communications, Tokyo, Japan

Large molecules of mass number 600-800 were synthesized by ultrasonic irradiation of aqueous benzene solutions. Production of these molecules was insignificantly dependent on the concentration of solutions. On the other hand, different products were observed by changing of the solution concentrations, as found by HPLC analysis.

The concentrations of sample solution were 10 mM, 20 mM and 28 mM. This experiment was carried out at 20 degrees under Ar at 200 kHz and 40W, as determined by calorimetry. After the irradiation for 30min, all sample solutions turned yellow because of formation of polymers. The color of sample solutions darkened with time and then brown or dark-brown powders precipitated. These products were rinsed with methanol to remove small-size aromatic hydrocarbons and the residue materials were dissolved in benzene. By the FAB-MS analysis(Fig.1), peaks at mass number 608, 632, 648, 664, 710 were confirmed in all sample solutions(790 is only in 20 mM). Therefore it was revealed that large molecules were synthesized by ultrasonic irradiation of all sample solutions. On the other hand, different products were observed by changing of the solution concentrations, as found by HPLC chromatogram of toluene extract of the residue materials.

![Fig. 1: Mass spectrum of products dissolved in benzene](image)

**Keywords:** Synthesis in water, Benzene, Sonolysis, Cavitation, Concentration dependence