

### *Polymer Purification*

In the course of physical properties measurements on polymers it is often necessary to convert the commercial pelletized polymer samples (molding powders) into a fine granular powder in order to achieve purification and drying and for remolding into films and pellets of suitable shape and size for measurements such as differential thermal analysis, specific heat, density, infrared and other spectroscopy, heat of combustion, etc. The conventional method of dissolving the polymer in a solvent and precipitating into an excess nonsolvent is rather laborious, wasteful, and time consuming. The solvents required for some polymers are at times not easily obtainable or are sometimes corrosive, drastic, and hazardous, for example, cresol or sulfuric acid for nylon. A very simple technic of pulverizing and purifying polymers is possible. The polymer sample and about 5 to 50 volumes of a borderline solvent or a critical solvent-nonsolvent mixture are charged in an autoclave, a bomb, or a small stainless steel capsule with screw cap and gasket, and heated under self pressure (about 10-20 atmospheres for most liquids) to an elevated temperature in the range 100-200°C. The bomb is cooled, opened, and the polymer is obtained in fine granular form with all low molecular weight impurities such as antioxidants, stabilizers, plasticizers, etc. extracted out into the supernatant liquid. The process may be repeated for more purification. This technic was successfully applied to nylon (with ethyl alcohol at 150°C.), polyethylene or polypropylene (with *n*-pentane or hexane at 120°C.), polystyrene (with acetone at 150°C.). It can be extended to any commercial molding powder or scrap with a suitable borderline solvent and a temperature range found out by a few trials. In some industrial applications the suggested technic of thermal bombardment can save a large amount of cold grinding and pulverizing equipment of a special kind required for polymer scrap.

R. M. JOSHI

National Chemical Laboratory  
Poona, India

Received July 6, 1966