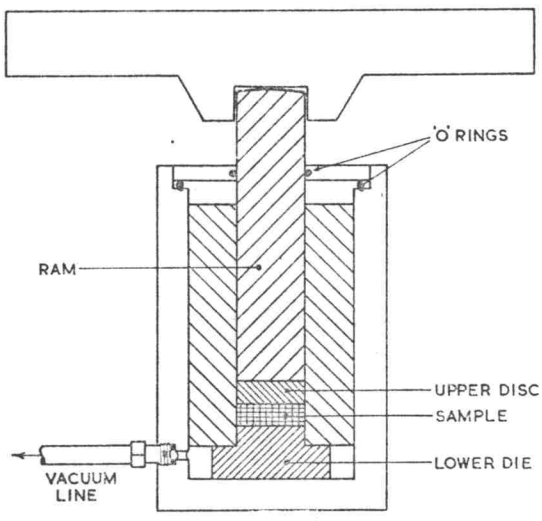

Fig. 1. Stainless steel pressure vessel.

mounted between the plattens of a laboratory hydraulic press capable of applying a pressure of 22,400 lb. on the central ram of the pressure vessel. In-source irradiations in the pressure vessel were carried out at a dose rate of 2.88×10^5 r/hr. For postradiation polymerization studies, samples were irradiated without applied pressure for 1 hr. *in vacuo* at a dose rate of 3.3×10^5 r at $-50°$C. Polymerizations were then carried out *in vacuo* at 19°C. by pumping air at room temperature through the heat exchanger surrounding the pressure vessel.

Irradiations were carried out with gamma rays from a 6 kilocurie ^{60}Co source. Dose rate in the pressure vessel was determined by glass dosimetry calibrated against the Fricke dosimeter, assuming a G value of 15.6 for the oxidation of ferrous ion.

Immediately after irradiation, or at the end of a timed period for post-polymerization, the samples were ejected from the pressure vessel into precipitant and the polymer separated by filtration in a sintered crucible. The filtrate was crushed to a fine powder and thoroughly washed to remove all included monomer residues. Polyacrylamide and polymethacrylamide samples were vacuum dried to constant weight. Residual water was removed from the polymers of barium methacrylate and calcium acrylate by heating at 110°C. for 48 hr. Comparison of the densities of the monomers and radiation-induced polymers was carried out in mixed liquid by a flotation technique.

Results and Discussion

Data obtained for the conversion to polymer for the four crystalline monomers are shown in Figures 2–6. The application of 90,000 psi to the in-source polymerization of acrylamide and methacrylamide has the effect of reducing the overall polymer yield while the same pressure increases the