

—50°C., from which it is
stress, be it retardation or
tion.

zation of the amorphous
the dihydrate (Fig. 7), a
.³ At room temperature
y low conversion (2-3%);
reaction to complete con-
t would be that applied
to simulate the conditions
removal of defects. Such an
the crystalline monomers

under pressure may be related to the known effects of high pressure on the polymerization of liquid monomers.

Pressure Dependency

Further evidence in support of the above theory derives from a study of the effect of lower pressures. The pressure required to maintain a uniformly high yield of polymer at high conversion is less in the case of amorphous calcium acrylate than for the crystalline monomer; for the former a sharp pressure transition exists between 5000 psi for which the yield is the same as for an unpressurized polymerization. Above 10,000 psi the yield is constant up to our working limit of 90,000 psi. The crystalline salt exhibits an almost linear relationship for polymer yield with pressure above a minimum close to 23,000 psi.

TABLE II
Effect of Temperature on In-Source Polymerizations

Monomer	Irradiation dose $\times 10^6$ r	Temperature, °C.	Applied pressure, psi	% conversions
Acrylamide	0.97	19	0	4
	0.97	19	90,000	2
	0.97	80	0	76
	0.97	80	90,000	77
Methacrylamide	3.94	19	0	2
	3.94	19	90,000	0.4
	3.94	80	0	26
	3.94	80	90,000	5
	3.94	100	0	80
	3.94	100	90,000	21
Calcium acrylate (crystalline dihydrate)	0.47	19	0	2.5
	0.47	19	90,000	13
	0.47	80	0	3
	0.47	80	90,000	81
	0.47	100	0	34
	0.47	100	90,000	72
Barium methacrylate (crystalline anhydrate)	5.45	19	0	1.3
	5.45	19	90,000	3.1
	5.45	80	0	2.8
	5.45	80	90,000	1.5
	5.45	100	0	1.4
	5.45	100	90,000	1.4
		E 15 psi kcal./mole	E 90,000 psi kcal./mole	
Acrylamide		14	17	
Methacrylamide		10	5	

1.0

amide and methacrylamide
acid salts propagate only in
polymerization of acrylic
containing discontinuities,
re to the movement of dis-
hile this might be a feasible
rs polymerized just below
the same explanation can
melting points, even at the
creased rate for the amor-
basis of our introductory
reme case of a randomly
he liquid phase. The fact
gation reaction only exists