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used in this work were

prepared by first arc melting a Pu 11.1 wt.-% Ga master alloy. The master alloy was diluted with unalloyed plutonium to the desired composition in either an induction or resistance heated vacuum furnace where it was also cast to shape. The initial arc melting prevented compound formation so that subsequent dilution in resistance or induction melting facilities could be successfully accomplished at melt temperatures of approximately 900°C. When reference is made to the "homogenized condition" in subsequent text, a 150 h anneal in vacuo at 450°C is implied. Since the grain size was of the order of 0.005 - 0.007 mm, the anneal was more than sufficient to achieve complete homogenization. The average impurity content of the alloys is presented in Table 6-I.

Element	Analysis (ppm)	Element	Analysis (ppm)
Al	27	Mg	5
Ca	<5	Mn	11
Cr	2	Ni	5
Cu	9	Si	<15
Fe	<50	C	160
			<289

Table 6-I Average Chemical Analysis of Pu-Ga Alloys

2.2 Experimental Techniques

2.2.1 X-Ray Diffraction - Specimens were mounted in polyester resin in 3/4 in. ID mounts. The mounted specimen was faced flat on a small lathe in increments of 0.010, 0.005, 0.002, 0.002, 0.001, and 0.001 in., in that order, to minimize alpha phase formation during machining. Rough polishing was accomplished on the 180, 260, 600 grit cloths on rotating laps.

2.2.2 A Syntron vibratory polisher using silk cloth and Linde A alumina abrasive for 2 h served as the intermediate polish. Carbon tetrachloride was used as a lubricant. The final polish consisted of an initial 100 second electropolish at 20 V and 0.8 - 1.0 amp in an electrolyte composed of 20 parts