be reversible and is un-
tics.

fore, even when complete-
th respect to the appli-
.1 to 1.5 wt.-% Ga gra-
ee of pressure metastab-
be greater. A test for
nized condition would
before and after the
the density increase
er the alloy is from the
m or homogenized condi-
e should decrease and

dency to form intermetal-
he alloy. For alloy com-
nation of Pu_xGa_y compounds
ta stabilization. Thus,
specified the amount of
ay be substantially lower.
ng induction or resist-
hat melt temperatures in
hieved. Because of the
hieved during arc melt-
prevents the formation

dies performed by other
entioned methods was
it was decided to re-
n several properties us-
dition, it was decided to
stability in both cored

ocedure

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