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POINT DEFECT RECOVERY OF SHOCK DEFORMED IRON ALLOYS

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1. Introduction

Recovery phenomena in iron alloys indicate that various measurable properties may recover at different rates[1], [2]. The recovery of electrical resistivity in deformed, quenched and irradiated metals has shown that point defects have been produced. Kressel and Brown[3] have shown that point defects dominate the microstructure of shock deformed nickel. Murr and Vydyanath[4] have attributed thermal recovery of shock loaded 304 stainless steel to the annealing out of point defects. The work of reference (4) employed microhardness measurements to monitor recovery. Previous experimental work[3] has shown that electrical resistivity is sensitive to vacancy and interstitial changes in shocked metals. No experimental results on the recovery of electrical resistivity of shock deformed iron alloys have been published. This paper investigates the nature of defects formed and the recovery of initial flow stress and electrical resistivity in shock deformed iron manganese alloys.

2. Experimental Details

The Iron manganese (Fe-7.37 wt & Mn) specimens were initially annealed at 900°C and furnace cooled. The shock deformation was accomplished in the usual manner[5]. The variation of flow stress with the amount of shock deformation and length of recivery anneal was determined by straining the shocked specimens in a Tinius Olsen machine. The four probe resistivity technique was used to measure resistivity as described elsewhere[3].