6.2. Summary

The conclusions reached and results obtained during the course of the present work are as follows:

1. Equilibrium thermodynamics provides an adequate description of the shock induced anisotropy effect.

2. Established concepts of domain theory predict that the equilibrium exchange and dipolar energy is proportional to the fourth root of the strain and is negligible in the high elastic and plastic shock region.

3. A needle or sliver shaped domain structure oriented in the direction of shock propagation is expected to nucleate behind the shock front.

4. Consideration of the shock induced anisotropy effect in magnetic polycrystals revealed the importance of magnetic grain-grain interaction. Assumptions of interacting grains and independent grains were defined to describe the possible extremes of this interaction.

5. Data on polycrystalline yttrium iron garnet were obtained in the region of large elastic strain. The results support the independent grain theory as more representative of actual behavior.

6. The experimental results indirectly support the domain theoretical analysis.

7. The effect of porosity has been shown, by analysis and experiment, to be small in the region of the magnetization curve considered.

8. Conventional magnetoelastic theory provides a sufficient characterization of the shock induced anisotropy effect for strains up to at least two-thirds the elastic limit.

9. An experimental technique capable of magnetic measurements on the shocked material has been designed, implemented, and analyzed.