

**Thesis Title** A Study to Develop Plastic Magnets Based on Poly(vinyl chloride) and Barium Ferrite Composites  
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### Abstract

This study utilised barium ferrite as a magnetic filler in polyvinyl chloride (PVC) compound. Barium carbonate and ferric oxide were used to prepare barium ferrite through solid state reaction. The particle size distribution of the barium ferrite prepared was measured using scanning electron microscopy.

The first part of this thesis deals with the compounding, formulation and processing conditions optimisation to achieve the optimum processability, impact strength and acceptable magnetic properties. The impact strength of the products produced was evaluated using Charpy notched impact strength testing. A B-H tracer was used to assess the magnetic properties. The results obtained indicated that the optimum moulding temperature was 160°C.

In the second part, the impact strength improvement was studied through the addition of coupling agents and epoxidised liquid natural rubber (ELNR) as an impact modifier. The results obtained indicated that silane coupling agent (A-1100) did not improve the impact strength,

by contrast, both zirconate coupling agent (KZ-TPP) and ELNR improved the impact strength.

The last part describes an attempt to improve the magnetic properties using orientation of the PVC molecules and magnetic filler particles before moulding. The results obtained indicated that the orientation introduced into the composite did not improve the magnetic properties in this case because of molecular relaxation of the PVC during compression moulding