Lalita Kantiyong 2009: Magnetic and Mechanical Properties of Barium Ferrite-Natural Rubber Composites. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Assistant Professor Wirunya Keawwattana, Ph.D. 118 pages.

Barium ferrites ($BaFe_{12}O_{19}$) have been synthesized using the Oxide One Pot Process (OOPS). These precursors were calcined at 600, 800, 1000 and 1200 ^{o} C for 2 hrs, during which time the precursor that calcined at 1000 ^{o} C was found both hematite and hexagonal ferrite whereas the precursor calcined at 1200 ^{o} C was transformed to the hexagonal ferrite. With increasing the calcination time of precursors calcined at 1000 ^{o} C from 2 to 8 hrs, the ones calcined for 8 hrs became hexagonal ferrite phase with high purity, resulting in high magnetic properties, including the coercivity (H_c), saturation magnetization (M_s) and magnetic Remanence (M_r). The effect of barium ferrite (commercial grade) on the cure characteristics, mechanical and magnetic properties of RFCs was investigated. Commercial hexagonal barium ferrite was incorporated with various loading in the natural rubber matrix to produce rubber ferrite composites (RFCs). Tensile strength increased up to 100 phr and then decreased. Modulus and hardness increased, while elongation at break decreased gradually with increasing barium ferrite loading. SEM was used to determine the dispersion of filler in rubber matrix, the fine dispersion of barium ferrite particles in the rubber matrix can be observed. The magnetic properties of these composites were studied using a VSM at room temperature (25 ^{o} C). The results show that the H_c of the composites increased with increasing filler content up to 140 phr. Comparison of the magnetic and mechanical properties between RFCs with commercial barium ferrite and barium ferrite synthesized by OOPS was undertaken. RFCs with synthesized barium ferrite showed lower tensile properties and hardness, while greater magnetic properties than those of RFCs with commercial barium ferrite. The addition of 30 phr carbon black into RFCs improve mechanical properties was conducted

_____ _____ ___ / ___ / ___

Student's signature Thesis Advisor's signature