

Sitthisak Sorlateap 2013: Improving Magnetic Properties of Rubber Ferrite Composites by Doping Barium Hexaferrite Synthesized by The Oxide One Pot Synthesis (OOPS) Process with Lanthanum (La). Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Assistant Professor Wirunya Keawwattana, Ph.D. 124 pages.

The Oxide One Pot Synthesis process (OOPS) has been used for barium hexaferrites ($\text{BaFe}_{12}\text{O}_{19}$, BaF) preparation. The improvement of magnetic properties of barium hexaferrites including the coercivity (H_c) and saturation magnetization (M_s) by La substituted and La-Zn co substituted was investigated. It was found that M_s and H_c increased by substitution of La ions on Ba sites at the content up to $x=0.15$ and then decreased. However in term of La-Zn substitution, M_s and H_c were dropped in due to the formation of ZnFe_2O_4 and the incomplete conversion to BaF. Magnetic properties (M_s and H_c) are dependent on amount of magnetic filler and their own magnetic properties. Moreover, EDX showed the spectrum of La. It was confirmed that La can be completely substituted in barium hexaferrite. The effect of BaF ($\text{BaFe}_{12}\text{O}_{19}$ and $\text{Ba}_{1-x}\text{La}_x\text{Fe}_{12}\text{O}_{19}$) on the cure characteristics, mechanical and magnetic properties of rubber ferrite composites was also reported. The cure characteristic of RFCs is dependent on the particle size of fillers. It was found that RFC 1 (filled with commercial grade BaF) gave the lowest cure time and scorch time because the commercial grade BaF had a smaller particle size than synthesized BaF which gave the higher surface areas, then filler-rubber interaction was better than those of RFC 2 (filled with synthesized BaF) and RFC 3 (filled with La doped BaF). It was also found that tensile strength and elongation at break of RFC 1 were higher than those of both RFC 2 and RFC 3 due to the effect of particle size. Moreover, RFC 3 gave the highest magnetic properties as compared to RFC 1 and RFC 2.

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