



Development of magnetic rubber beads for oil and gasoline sorbents

Siriwit Buajareern* and Chawapol Rojanarawong

*Department of Chemistry, Faculty of Science and Technology,
Thammasat University, Thailand*

*e-mail: siriwit@yahoo.com

Numbers of publications had been reported on modification of natural rubber and utilization as sorbent for various hydrocarbon compounds especially oil. Even though there were some that emphasis on rubber composite with magnetic particle but hardly any that fabricating into bead shape material. Since the bead shape possess higher surface area and more flexible to use as sorbent in many environment. This work is focusing on synthesis of magnetic rubber bead composite with Fe_3O_4 nanoparticles and later its sorbent capability on oil and gasoline. Rubber bead was fabricated by using coagulation of latex in aqueous and non- aqueous solution; 1M hydrochloric, 1M acetic acid, acetone and ethanol which proper size and physical characteristics was achieved when using acetone. With fixed extrusion speed, this processes can successfully produce the rubber bead size of approximately 3.5 mm. Difference ratio between rubber and Fe_3O_4 nanoparticles had been tried for magnetization competence properties and 5:1 ratio yield optimum result. Sorbent capability for palm oil, diesel, and gasohol 91 yield maximum absorption after 5 hours immersing period under room temperature and 9 hours for 5°C immersing temperature. Moreover the rubber and Fe_3O_4 nanoparticles at 7:1 ratio expressed the highest absorption capacity values for palm oil, diesel, and gasohol 91 of 6.8, 12.8 and 15.5 g/g respectively. Renewal of absorbed rubber beads was simply done by put the material in hot air oven at 120°C for 3 hours but this restoration procedures can be done just only 3 times because of the leaching of Fe_3O_4 nanoparticles, hence lower the magnetization property of rubber beads.

Keywords: Natural rubber; Magnetization; Sorbents