

Nano Asphalt Production Using Micro emulsion and Sonication Method: Yield Optimization Using Surface Response

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Abstract

The largest natural asphalt deposit in the world is located in Buton Island (Indonesia) which is around 677 million tons. Efforts in utilizing the Asbuton rock to produce asphalt as the replacement of petroleum asphalt have been carried out by other researchers, but they only produced a conventional type of asphalt. Also in general, the method that was used is quite expensive. The conventional asphalt in road pavement is unable to withstand traffic loads and excessive temperatures, resulting in deformation. This research is about making nano asphalt from Asbuton rock with using a combination of microemulsion technique and sonication. The advantage of this technique is the effectiveness of the process in producing the nano asphalt, that is by extracting the asphalt from the pores of Asbuton rock simultaneously forming (in-situ) the nanoparticles. Experimental variables that are varied in this study are the temperature, oil fraction, type of solvent, particle size, and type of surfactant (HLB). To find the optimum Yield of nano asphalt, the involved variables are simulated and optimized by using Factorial Design, Pareto Diagram, and Response Surface methods. The comprehensive results from the simulation are presented in this report including the significant variables which were optimized to produce the optimum Yield of nano asphalt. The optimum Yield of nano asphalt theoretically generated from Response Surface ranged between 80 – 99.90 %. The results of validation with experiments using optimized variables show the similarity between the optimum Yields and the simulated Yields value. The produced nano asphalt were investigated by Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM), Infrared Spectrophotometer (IR) and X-Ray Diffraction (XRD) to prove the quality of nano asphalt.

great passion is to create and develop nanomaterials especially in the field of catalysis. Because she is also concerned about the environment, her research is now heading to the field of green synthesis and biofuel production. Her advanced knowledge and experience in microemulsions making her able to synthesize and design the super active nanocatalysts in a greener way.

Speaker Publications:

1. “A new method to synthesize very active and stable supported metal Pt catalysts: thermo-destabilization of microemulsions”; Journal of Materials Chemistry. 22(23), 11605-11614
2. “Particle shape optimization by changing from an isotropic to an anisotropic nanostructure: preparation of highly active and stable supported Pt catalysts in microemulsions”; Nanoscale / 5 (2), 796-805

[31st World Nano Conference](#); Webinar- November 24, 2020.

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Biography:

Riny Yolandha Parapat is a quality scientist. Her expertise in synthesis of nanocrystal via microemulsions technique. Her