



Riny Yolandha Parapat

Itenas Bandung-TU, Germany

Nano asphalt production using microemulsion and sonication method: Yield optimization using surface response

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 micro emulsion 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 was 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.

Biography

Riny Yolandha Parapat is a quality scientist. Her expertise in synthesis of nanocrystal via micro emulsions technique. Her 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 micro emulsions making her able to synthesize and design the super active Nano catalysts in a greener way. She has discovered a new method to synthesize highly active supported Nano catalysts, so-called thermo-destabilization of micro emulsions. Not only is she active in doing research, she is also a Lecturer in the course of kinetic and catalysis, experimental design, process control, and plant design.