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PREPARATION OF NANO-ASPHALT FROM NATURAL ASPHALT

Research on nano asphalt offers a promising prospect because it can significantly enhance the performance of asphalts at both low and high temperature. Nanoparticles are the key materials that can improve mechanical and physical properties also durability in road pavement. It has been reported that adding of nanomaterials such as nanosilica, nano calcium carbonate, nanotubes, and nanoclay in asphalts mixture will increase the viscosity of asphalt binders and improves the rutting and fatigue resistance of asphalt mixtures. Several attempts have been conducted to make nano asphalt i.e. by mixing mineral nanoparticles or oxides into the asphalt. However, this method has some disadvantages such as the tendency of the nanoparticles to agglomerate and the difficulty to distribute them evenly in the asphalt mixture because of the high viscosity of asphalt. Also, the price of those nanoparticles is still expensive. In this work, we are using a facile and economical method to produce nano asphalt. The nanoparticles are produced directly during the process from the natural asphalt in the Asbuton rocks which are found in Buton Island (Indonesia). The nanoparticles are produced and mixed evenly in the system by combining the microemulsion method and ultrasonication. Therefore, it is not necessary to purchase the expensive nanoparticles for making nano asphalt. The influence parameters such as the concentration and kind of solvent, concentration and kind of surfactant, and mixing temperature were studied. The little amount of both solvent and surfactant that are used in this method (less than 5%) with the high yield of each variation (around 99%), make this process worth to be developed and applied in the road pavement.

Biography

Riny Yolandha Parapat has her expertise in synthesis of nanomaterial via microemulsions technique. Her great passion is to create and develop nanomaterials. Because she is also concerned about the environment, her research is focusing more to produce nanomaterials by utilization of natural resources such as natural reductant and natural asphalt. Her advance knowledge and experience in microemulsions making her able to synthesize and design nanomaterials. She has discovered a new method to synthesize highly active supported nano catalysts, also formulate the nano asphalt. Not only she is active in doing research, she is also a Lecturer in the course of kinetic and catalysis, experimental design, process control and plant design.

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