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Absorbent Materials Applied for Oil/water Separation

Oil has become an important commodity in the world. However, the world oil demand has been increased due to the growing global population, and as long as oil transportation worldwide continues to increase, many communities are at risk of oil spill disasters, which can produce severe damage to the ecosystem and loss to human society. Different response methods have been used for removing oil from the sea surface, such as dispersants, mechanical recovery methods. But, these kinds of methods have several disadvantages that are difficult to address including their complicated operation, high cost, oxygen content, organic species, and high energy required. Currently, sedimentation, filtration, and absorption are physical methods that have been used for cleaning up oil-polluted water. Of these methods, absorption methods are received a lot of critical attention because of their simple operation, low energy consumption, high efficiency and superiority with organic materials that are difficult to degrade. In this study, cotton, hemp, kapok, fiberglass, polyester, and nylon fibers have used to build a porous medium and to study the efficiency for each fiber materials applying for oil or water absorption applications. Methods for characterizing the fiber materials were studied and experiments were performed to evaluate the efficiency of these fibers and prove that they are an excellent choice for resolving the problem of oil/water pollution. The character of hydrophobic and oleophilic for the fiber materials was successfully confirmed by spontaneous imbibition. The spontaneous imbibition experiment was performed to determine the wetting behavior of the fiber materials with different hydrocarbon oils.