Adsorption and Desorption of Oil Spills using Jordanian Zeolitic Tuff

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Zeolitic Tuff is a natural volcanic mineral that is mined in Jordan. It has a chemical structure of hydrated aluminum-silicates of sodium, three dimensional crystalline framework of tetrahedral silica strongly bonded at all corners. That gives it its porous structure, and contains channels filled with exchangeable cations that could attract and trap positive ions of metals and oils. This study found that Jordanian Zeolitic Tuff nanoparticles have oil adsorption capacity of 90.5% its mass, the adsorption efficiency is affected by surface area until it reaches the max and stops. We can release 100% of the adsorbed oil if we add toluene in specific ratio to the oil mass which is 10: 0.725. This study suggests that using a net stuffed with Zeolitic Tuff is the best cost efficient practical method for applying Zeolitic Tuff on oil spills. To desorb oil, a well-designed device to apply toluene is used nets safely. The device also has the ability to treat the net thermally to re-use it 10 times over, and the whole cost of removing and reusing spilled oil would be less than 24.928 $ per liter including oil refinery . Which show us how effective and cost-efficient Zeolitic Tuff could be if we use it in removing oil spells, which is a serious environmental and economic problem.

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