Abstract

The removal efficiency of Nanoscale Zinc Oxide (nZnO) for remediation of trinitrotoluene (TNT)-contaminated water was studied. These were to determine the optimal dosages of nZnO, removal efficiency or degradation rate, kinetic removal rates and photocattalytic effects on remediation TNT-contaminated water by nZnO. The particle size of nZnO was found between 40-80 nm. Generally, the particles werepacked into larger clumping upto 10 μm or more in diameter.The mean surface area of this particle was9.56±0.04 m^2/g with the purity of 99.98%.The varying concentrations of nZnO were used at 1,000, 2,000 and 3,000 ppm for remediation of TNT-contaminated water with the concentration of 10 mg/L. The results were found that the removal efficiency were similar at 2,000 and 3,000 ppm of nZnO concentrations (29.20 % and 29.43 %, respectively). With regard to the optimal times and removal efficiency, the times were varied at 10, 20 and 30 minutes. The nZnO with the concentration of 2,000 ppm was added to TNT-contaminated water and the mixture was left for required periods of time. It showed that the removal efficiency was increased with times. However, the highest efficiency was found only 34.35 % with the time point of 30 minutes. The photocattalytic effect on remediation of nZnO for TNT-contaminated water was carried out by exposing the mixture of nZnO and TNT-contaminated water to the sun light at three different periods of time (morning, afternoon and evening) for 30 minutes. The light intensity pH and air temperature were also observed and monitored. The results demonstrated that the highest removal efficiency was found at 71.93 % in the afternoon meanwhile those in the morning and evening were 52.12 % and 50.99 % respectively. This study concluded that the remediation of TNT-contaminated water by nZnO can be enhanced under exposure to the sun light as a photocatalyst.