

Effect on sound property of singing sand by adsorption of heavy metal ions

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Singing sand is the sand that sounds by pressure and exists in all over the world. It can be seen mainly in coast, and there is also in desert area. At least more than 30 singing sand sites are in Japan. The organization for protecting them was established.

Although many studies have reported conditions that singing sand makes a sound of mixtures of singing sand and particles or oil, there are few researches that studied sound property of the singing sand adsorbing chemicals. This study analyzed the sound property of the singing sand adsorbing and desorbing various heavy metal ions, in order to evaluate the effect on sound property of singing sand by heavy metal pollution.

The frequency spectrum graphs of the sound of the original singing sands, the singing sands adsorbing Mn^{2+} , Cd^{2+} , Pb^{2+} , Ni^{2+} , Cu^{2+} , Zn^{2+} or Cr^{3+} in different solutions of each ionic concentrations and pH, and the singing sands desorbing heavy metal ions by ultrapure water after adsorption experiment were made. The concentrations of heavy metal ions in the extracted solution after adsorption and desorption experiments were analyzed to elucidate the adsorption and desorption quantities.

The frequency spectrum of the sound of the original singing sands showed 3 characteristic peaks. The frequency spectrum of the sound of the singing sands adsorbing heavy metal ions had the peak in low frequency and the peak of the highest frequency disappeared. The disappearance of the sound property occurred in the sands adsorbing Cu and Mn. After washing heavy metal ions adsorbed by sands with ultrapure water, all sand samples have a sound property showing the tendency to be similar to that of the original singing sand. The relation of adsorption quantity, frequency spectrum and pH suggest that adsorption of hydroxyl complex could effect on the sound property of singing sand.

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