Chemically Modified Jordanian Zeolitic Tuff for Removal of Heavy Toxic Metals from Industrial Water

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Water pollution caused by industries has become a major problem around the world. Heavy toxic metals found in industrial wastewater are listed under the environmental pollutants category due to their toxic effects on plants, soil, animals and human being.The aim of this project is to remove heavy toxic metals using modified Jordanian Zeolitic Tuff and Silica Sand to get water that can be used in agriculture and industry. Taking into consideration that these metals are expensive, the project recycles the Zeolite and Silica Sand by removing the metals. As a result, pure Zeolite and Silica Sand were obtained to be used again in the project, and heavy metals to be also reused in industries. Jordanian Zeolitic Tuff was modified by acids to get rid of the undesired materials to form efficient pure Zeolite nano-particles, a structure that has a large inner surface area and consists of only aluminum silicates. Silica sand is industrial sandstone that consists mainly of quartz and is used to improve the efficiency of the project by adsorbing some heavy toxic metals before Zeolite adsorbs the rest. The project was prototyped and experiments were successful as the prototype successfully removed chromium, nickel, cadmium and zinc and showed around 97% adsorption of the metals. This indicates that we can make a pilot plan for industries to solve this problem. Finally, this project is an efficient, low-cost technology, easy to manufacture and easy to maintain.

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