Experimental and Simulation Study on the Migration Rule of Arsenic in the Soil of Surface Karst Zone in Southwest China

*bin zeng[1]

1. China University of Geosciences

Karst Underground River is an important water source in southwest China. In addition to entering and polluting the groundwater directly through the sinkholes, arsenic pollutants produced from the industrial production process will also adsorb, remain, and concentrate in the dissolution cracks and gaps in the surface karst zone, and remigrate under certain conditions to become a "secondary pollution source". Taking an arsenic pollution event in Guangxi province as an example, the dynamic adsorption and desorption experiments of arsenic were carried out by using narrow slot physical model device, and the migration rule of arsenic contamination in the soil of surface karst zone was studied, combined with geochemical simulation. The experimental results show that the adsorption of arsenic in the surface karst zone is mainly physical adsorption (diffusion process), and the desorption rate is slow compared with the adsorption process, while the acid solution can promote the desorption process of arsenic compared with deionized water. The results of geochemical simulation show that goethite contributes most to arsenic adsorption in soil minerals, while acid solution weakens the ability of arsenic adsorption by corroding goethite and other minerals. It is concluded that in the karst area of southwest China, once the surface karst zone system is integrated with arsenic pollutants, the desorption process is slow, and it is easy to form the retention and enrichment of arsenic pollutants; while the accelerated desorption and migration process of arsenic under acid rain will increase the pollution risk of groundwater system.

Keywords: surface karst zone, arsenic pollution, physical model experiment, geochemical simulation

