

Evolution mechanism of groundwater environmental factors under artificial recharge

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Research Content

In order to study the effect of artificial recharge on the groundwater quality, the mixed effect of artificial recharge water and groundwater was studied by use of mathematical simulation. The evolution of the groundwater environment and characteristics of elements was studied by analysing the correlation of different amount of recharge water, temperature, redox conditions and pH, which provided basis for environmental control in indoor simulated experiment.

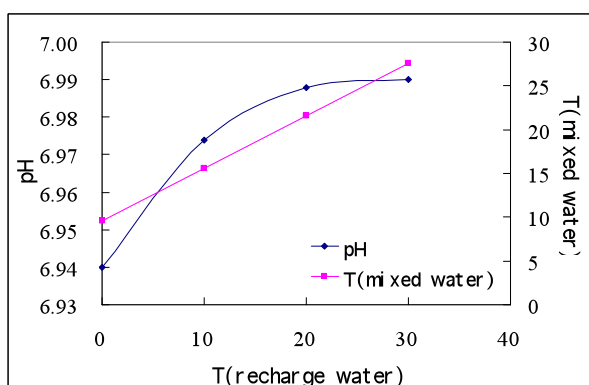


Figure 1: Curve of T of recharge water vs pH and T of mixed water (Recharge water:Groundwater=6:4)

Results

The artificial recharge water will not lead to catastrophe or decrease of water quality in aquifer, and it will improve water quality in aquifer to some extent. The influence sphere of temperature, redox conditions and pH in different artificial recharge conditions was determined.

Discussion on radioactively environmental problems during phosphorite mining and processing in Longmenshan area

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Longmenshan area is the main phosphorite producing zone in Sichuan province, with abundant phosphorite resources which are mostly reserovired in strata of upper Sinian, lower Cambrian and upper Devonian. The phosphorites are neritic sedimentary deposits characterized by containing less high-grade ore, more lean ore and harmful impurities unevenly distributed. There are two major phosphorite mines in studied area: Qingping and Jinhekou mines. And the phosphorus chemical enterprises in Sichuan province are mainly located in the Tuojiang basin.

Phosphorites, especially the marine facies phosphorites are widely distributed and strongly accumulated in uranium. Most of phosphorites have high radioactive uranium contents. Owing to phosphorite mining and processing in Longmenshan area, the Chengdu plain, especially in Tuojiang basin, has higher level in radioactive element content. The primary source tracing results show that average content of uranium in phosphorites is 31.0mg/kg, much higher than the background value, and nearly 10 times of uranium content in wall rock. And the average content of uranium in phosphate fertilizer is 20.9 mg/kg, about 7 times of that in wall rock. Phosphorite mining and processing are main causes for the high radioactive elements contents in this region.

The uranium content analysis on the main river water of Tuojiang basin, Mianyuan River and Shitingjiang River, shows that the average uranium content in water is up to 1.90 ng/ml of Mianyuan River, and 0.79 ng/ml of Shiting River. Both of the values are much higher than the average level (0.309 ng/ml) of rivers all over the world.

The uranium content study on the horizontal and vertical profile of soil in the vicinity of phosphogypsum dumps in phosphate fertilizer plant shows that phosphogypsum dumping has great impact on the soil radioactive level with uranium diffusion more than 2km width in horizontal and 50cm depth in vertical.