

Distribution, Formation And Exploration Potential of Brine Lithium Resources in Tarim Basin- Mountain System, Northwestern China

CHENGLIN LIU^{1,2}, ZHEN YANG³, BO ZU⁴, CHUANG
ZHOU⁵, SONGYUANG ZHANG⁵, MINGZE MA⁵ AND
ZHAO CUI⁵

¹State key Laboratory of Geological Processes and Mineral
Resources China University of Geosciences, Wuhan, Hubei
430074 China

²Xinjiang Natural Resources and Ecological Environment
Research Center, Urumqi, Xinjiang 830000, China

³School of Earth Resources, China University of
Geosciences, Wuhan, Hubei 430074

⁴State key Laboratory of Geological Processes and Mineral
Resources China University of Geosciences, Wuhan, Hubei
430074, China

⁵School of Earth Resources, China University of Geosciences,
Wuhan, Hubei 430074, China

Tarim basin is located in the northwestern China, around by Kunlun Mt. to its south, Tianshan Mt. to its north and Altun Mt. to its southeast. The basin is a succession depositional one from Cambrian through Quaternary deposition. Its adjacent mountains had uplifted in large scale since late Proterozoic. There are hundreds of salt lakes distributed in the basin and its neighbor mountains, whose brines usually contain higher levels of lithium ranging from ten to hundred or more mg/L, mostly reaching the requirement of the comprehensive and solo industrial utilization. Kunlun mountain holds up more salt lakes, for example, Kushui lake has the content of lithium mostly up to one hundred mg/L. In the interior of the basin, Lop Nur salt lake holds up about two million t of LiCl in brine. In its mid and western parts, enormous quantity of oilfield waters and or formation waters are stored in aquifers of many strata up to thousand meters in accumulative thickness, most of these waters containing higher levels of lithium and having quite large potential reserves. The geochemistry survey shows that there are some level of lithium in river waters, which may be originated from the inter-mountainous salt lakes and thermal springs, and finally are discharged into the basin. In the salt lakes and depositional formations of the basin interior, the evaporation and rock-water interaction had resulted in the richening of lithium in both waters. The background dynamic for the brine lithium enrichment in the basin and its adjacent Mts is the subduction of Tarim plate into Western Kunlun and Tianshan mountains. Due to the long depositional history and mountains uplifting caused by the plate subduction, lithium of the basin maybe had recycled one more times from sediments in the basin into igneous rocks in mountains and reentered into the basin. The most successful example of “basin-mountain coupling” system for lithium mineralization is Qaidam's basin-mountain system to the south