The World’s Largest Soda-Niter Ore Intensive Region Found in the Turpan–Hami Basin

The Xinjiang Geology and Mineral Resources Exploration and Development Bureau have conducted a detailed investigation project of the Xigobi soda-niter deposit in Hami, Xinjiang Province, which was completed at the end of 2011. The project put much emphasis on research of soda-niter mineralization rules, stratum classification, ore-forming mechanism, and engineering grid control, etc. The sorting and grading of soda-niter resources are both improved. It is understood that, through the exploration and evaluation for various-sized soda-niter deposits in Xigobi, the Liaodunnan, Beishan, Hongxing Gobi, south Xiaocaoahu, and Shanshan County of Kumtag, mineral resources of soda-niter in the the Turpan–Hami Basin now amounts to 174 million tons, and the prospective resources are expected to exceed 250 million tons. Both figures indicate that the basin is the world’s largest soda-niter ore-intensive region. With its own resources equivalent to that of another large deposit of the same kind in Chile, the Xinjiang region has become one of the world’s largest soda-niter production areas.

Soda-niter (Sodium nitrate or Chile saltpeter) has a chemical formula Na[NO₃], with theoretical compositions (wB%) of Na₂O (36.5) and N₂O₅ (63.5). Typically forming colorless or yellowish diamond-like crystals, soda-niter is characterized by a bitter taste and rapid deliquescence; it is often accompanied by other compounds such as sodium chloride (NaCl) and sodium sulphate (Na₂SO₄). The crystal is rhombohedral in shape, similar to that of calcite. Its aggregates occur as granular, massive, hull-shaped, salt sinter, etc. and it reduces to a white powder when exposed in air. Soda-niter is very soluble in water, and therefore, arid, hot areas such as deserts provide the preferential geological background for soda-niter enrichment. Soda-niter is the product of a reaction of nitric acid decomposed from decaying organic matter by nitrobacteria with NaCl in soil. Other associate minerals include gypsum, Glauber’s salt, and rock salt.

Soda-niter, as a unique mineral in Xinjiang, is mainly distributed in two regions: Kumtag in Shanshan County and Xigobi in Hami, with the Kumtag deposit currently entering the development stage. Xinjiang will rely on the abundant soda-niter resources of the Kumtag area, and plans to build a ‘world-class’ natural fertilizer production base in Shanshan County in the next ten years. Experts consider that further large soda-niter deposits are highly likely to be discovered in peripheral areas of the Tarim and Turpan–Hami basins. Soda-niter has already been reported as found in the northern margin of Turpan–Hami Basin. For detailed information, please contact at geoacta@163.com (provided by Hao Ziguang, Fei Hongcai, Liu Lian)