

## **Comparison of Some Black-Shale-Hosted Barite Deposits in China, the U. S., and India**

<sup>1</sup>CLARK, S.H.B., <sup>2</sup>POOLE, F.G., and <sup>3</sup>WANG, Z. <sup>1</sup>U.S. Geological Survey, Reston, VA, U.S.A.; <sup>2</sup>U.S. Geological Survey, Denver, CO, U.S.A.; <sup>3</sup>Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing, China.

The success of barite exploration in the late 1970's and early 1980's, followed by a decrease in well-drilling activity, resulted in dramatic changes in world barite production patterns. The world's three largest producers are now China (53.2 %), the U.S. (10.6%), and India (7.3%), and the world's estimated total barite resources are 322 times annual production (1998 data). Most barite produced for use in drilling fluids is from stratiform marine black-shale-hosted deposits. In China, Late Proterozoic to Early Cambrian ocean-basin deposits occur on the margins of the Yangtze platform. U.S. deposits are mostly in Ordovician and Devonian ocean-basin rocks of Nevada. India's production is predominantly from a single Late Proterozoic deposit in a sedimentary basin on Archean basement. Geologic settings and geochemical signatures from these deposits suggest origins from submarine hydrothermal fluids with modification by biogenic processes. Ore-bearing sequences generally contain siliceous and carbonaceous shale, chert, and pyrite. Linear distribution of many deposits suggests a relationship to syndepositional fault zones. Sulfur isotope ratios of the barite deposits range widely and are significantly enriched in  $\delta^{34}\text{S}$  relative to coeval seawater. Sr isotope values from continental-margin-type deposits of Nevada and China are less radiogenic than those from intracratonic rift deposits. High  $\text{La}_n/\text{Ce}_n$  ratios from the barite region north of the Yangtze platform suggest a relationship to hydrothermal fluids while low  $\text{La}_n/\text{Ce}_n$  ratios on the south margin of the Yangtze platform suggest significant biogenic processes.