3. DIGESTION

Digestion is the operating heart of alumina refineries that use the Bayer process. The papers in this section concern the part of the Bayer process that

- prepares the bauxite to enter the process as a slurry in caustic liquor;
- attacks the alumina hydrate with caustic soda solution (liquor) at elevated temperature, putting the bauxite alumina in solution; and
- recuperates a large part of the heat energy used to elevate the temperature of the attack liquor.

Most alumina refineries use the Bayer process and, consequently, use bauxite that has its recoverable alumina in the form of alumina trihydrate mineral (Gibbsitic bauxite), or as a mixture of alumina trihydrate and alumina monohydrate mineral (Boehmitic bauxite). Only a few refineries use the Bayer process for bauxites containing a significant amount of Diaspore (Diasporic bauxite), where the chemical formula is the same as Boehmite but the form of the monohydrate crystal is different.

Diasporic bauxite is seldom used in the Bayer process because the digestion conditions required are more severe and less productive than with Boemitic bauxite. Also, many Diasporic types of bauxite contain prohibitively high silica content, resulting in costly losses of caustic soda in processing by the Bayer process.

China has considerable amounts of Diasporic bauxite, usually with relatively high silica content, and uses the Sinter Process to recover alumina. The process sinters the bauxite with (1) soda ash to attack the alumina and (2) limestone to react with and tie up the silica. There have been efforts in China to use the Bayer process in combination with the Sinter process to improve efficiency and reduce energy.

Don Donaldson