

A B S T R A C T

The occurrence of gallium in Jamaican bauxites was found to follow a log-normal distribution with its concentration falling in the range 48 - 75 ug/g. The average gallium content was found to be about 60 ug/g. Jamaican bauxites were therefore found to fall into the category of medium gallium content bauxites.

A study of the associations of gallium with the main aluminium and iron minerals occurring in Jamaican bauxites, showed that gallium may be present in the gibbsite, boehmite or goethite crystal lattice. The associations of gallium with these various minerals appear to be governed by crystallochemical factors. The distribution and associations of gallium in Jamaican bauxites tend to support the Limestone weathering theory of genesis of the bauxite.

A survey of the gallium steady state concentration in the plant liquors of the four bauxite alumina plants operating in Jamaica showed that gallium may be recovered from any and all of these plant liquors using existing technologies.

Studies of the adsorption of gallium on red mud suggest that the main mechanism of adsorption is physisorption and that gallium losses from plant liquors due to its adsorption on red muds should not be significant.

Infra-red analysis of gallium substituted goethite, indicates that the shift in the 400 cm^{-1} , 800 cm^{-1} and 900 cm^{-1} bands may be used for the quantitative estimation of the amount of gallium substituted in goethite.

Data from a systematic study of gallium extraction and accumulation in plant liquors demonstrated that the gallium steady state concentration was dependent on the bauxite mineralogy, in particular the distribution of the gallium among the various minerals, and on the plant design and operating parameters.

These results provided the basis for estimating the level of gallium reserves and recoverable resources existing in Jamaica and elucidated factors that are important for optimising gallium recovery from the bauxite/alumina industry.