

STUDY ON THE VIABILITY OF UPGRADING BRAZILIAN
SHALE FINES THROUGH FLOTATION

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ABSTRACT

The Mineral Technology Center-CETEM and the Research Center of PETROBRAS-CENPES, both attached to the Ministry of Mines and Energy of Brazil, have made a technical evaluation of the upgrading of shale fines of the Irati (Parana-Brazil) formation, prior to its use in the retorting and combustion processes, developed by the Shale Industrial Management (SIX) of PETROBRAS.

The technique of flotation has been employed to study the upgrading of raw shale fines rejected under the pyrolysis process of PETROBRAS-SIX. This study has aimed at the concentration of the organic material contained in this stock, so as to improve the feed quality and consequently making the most of the energy content of this stock.

In order to assess, the viability of the shale upgrading through flotation, several lab scale tests have been designed, so as to evaluate the enrichment of the stock through the increase in its heat capacity and the decrease in its ash and sulfur content based on the "Headsample", the yields being sufficiently high.

the process variables which have been studied encompass, for example: grain-size distribution of the feed by milling, agitation of the pulp, kind and dosage of collector and frother, ways of addition of the frother, pH, solids percentage and period of time of the collector conditioning. The tests have been conducted in a Denver sub-A-Type cell.

The results show that, for the variable studied concerned with the flotation process, the mass recoveries have been entirely satisfactory,

reaching up to 60% with the gain based on the heat capacity of the original sample being nearly 40%.

Besides, it has been observed that the milling up to 635 mesh (ultra-fines) is not attractive, at least in the flotation conditions investigated, since, although there be a greater degree of organic material freed, no increase in separation efficiency is observed. Nevertheless, a better comminution of the stock has favoured an increase in the shale flotability which is conveyed by an increase in yield.