MORPHOLOGICAL STUDY OF SEAL ROCKS USING NITROGEN ADSORPTION ISOTHERMS

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Abstract: The geometric and physical properties of the geologic materials, such as porosity and permeability, are important in various application fields and constitute technological and scientific interest. In the envirommental field, among others they are essencial in the remediations studies of contaminated areas, in projects of subterranean arrangement for nuclear trash. For the petroleum industry, those properties are directly connected to the productivity and efficiency of a reservoir. If earlier the attentions were centered in rocks reservoirs, today better knowledge in seal rocks is desired. In the petrological geology cap rocks are designed by rocks with a highly decreased permeability that can constitute barriers to the migration of the petroleum. The main parameters associated to the permeability are the specific surface area, the size, form, orientation and interconnection of the pores. It is knowledgeable that cap rocks present heterogeneous pore microestructure.

In the present work, the pore size distribution, cumulative pore volume and the specific surface area of seal rocks were measured using the adsorpition gas technique. The analyzed samples were given up by the Cenpes/Petrobras. The BET theory (Braunauer, Emmet and Teller) was utilized for the determination of the specific surface area and the BJH model (Barret, Joyner and Hallenda) for the pore size distributions, both analyzed of the nitrogen gas adsorption . The results are presented, proceeding an analysis of the limitations involved in the used techique. Also, the datas of the pore size distributions and of the specific surface area were evaluated in empirical equations as a way to estimate the intrinsic permeability of the seal rocks. These values were compared with direct measurements of the permeability in some analysed samples.

Keywords: Seal rocks, nitrogen adsorption, BET theory and BJH mode, intrinsic permeability.