

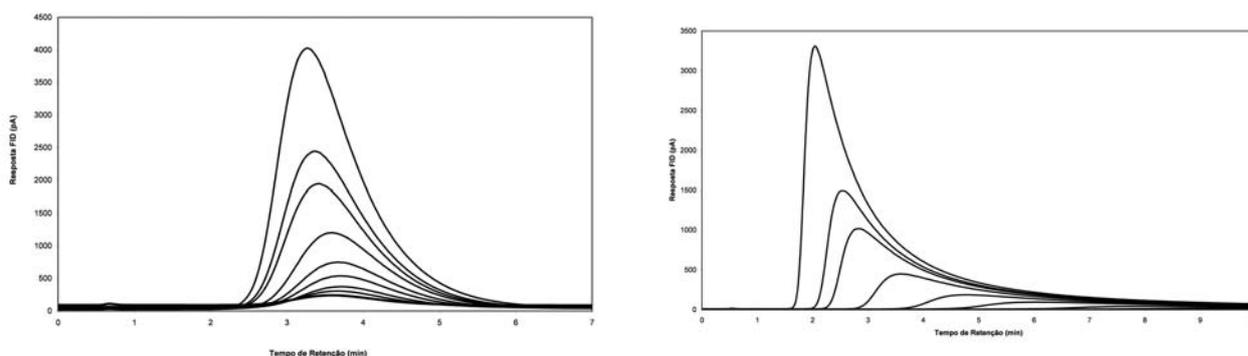
## Characterization and differentiation of kaolins by inverse gas chromatography

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This work aimed to study in detail the surface properties of two kaolins of distinct geologic origin: Andorinha kaolin (of sedimentary type) from Portugal and SPS kaolin (of residual type) from England. Inverse gas chromatography (IGC) was exhaustively applied to determine the surface properties, namely, dispersive surface free energy, acid-base properties, adsorption isotherms, surface area, permeability and surface heterogeneity of the clays. It has been verified that the SPS kaolin has a surface energy twice more energetic than the Andorinha kaolin. The surface heterogeneity and the different adsorption

mechanism, presented by these two clays, give rise to distinct chromatographs peaks shape (Figure 1).

Although the higher Gibbs free energy of the active sites, both clays present similar acid-base character. Even if the surface area is higher in SPS kaolin its particle morphology promotes higher permeability constant on this clay comparatively with the other. This work shows that the IGC is a successful technique for the characterisation of the surface properties of kaolins, distinct in terms of origin, particle size distribution and mineral and chemical composition, allowing their differentiation.



**Figure 1** - IGC n-octane peaks at different concentrations obtained for Andorinha kaolin (a) and for SPS kaolin (b), at 343k.

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