

## POLYMER ADSORPTION ON HYDROPHOBIC MINERAL SURFACES

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### ABSTRACT

Polymeric reagents are being increasingly used in the mineral processing industry to modify the surface properties of mineral particles in suspension. Polyelectrolytes and a group of natural products such as starches, dextrans and carboxymethyl cellulose, are examples of macromolecular reagents whose adsorption at the mineral water interface controls the dispersibility of the suspension and/or the hydrophobicity of the mineral surface.

The aim of this work was to study the adsorption mechanism of carboxymethyl cellulose (CMC) on hydrophobic mineral surfaces as this reagent is known to change the dispersibility and wettability of hydrophobic minerals such as talc, graphite and coal. Graphite was chosen as a model hydrophobic mineral for the experimental work. The effect of the polymer molecular weight, the pH and ionic strength

of solution, the temperature and the pretreatment of the graphite surface on CMC adsorption were established through adsorption isotherm measurements. Also, the effect of CMC adsorption on the wettability of the graphite surface was determined through floatability studies.

The results showed that the affinity of CMC for the graphite surface depended on the pretreatment of the surface. Thus, minor amounts of surface impurities (Fe, Ca) which could be removed by leaching with HCl, greatly enhanced polymer adsorption. CMC adsorption on the original graphite sample seemed to occur through surface complexation with metal cations. On the other hand, adsorption of CMC on the leached sample seemed to be of a different nature, the most probable mechanism being hydrogen bonding. The relevance of these studies to the separation of hydrophobic minerals and coal is discussed.

## POLIMERIZAÇÃO DE ÁCIDO METACRÍLICO EM MEIO NÍTRICO

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A polimerização de ácido metacrílico em solução aquosa de persulfato de potássio, ajustada a vários graus de acidez pela adição de solução aquosa diluída de hidróxido de sódio ou outras bases, pode resultar em produtos com taticidade controlável. Verificou-se que o aumento da alcalinidade do meio reacional conduz a produtos mais sindiotáticos. O agente neutralizante, além de afetar a estereoquímica dos produtos, influi na cinética e no mecanismo da polimerização.

Neste trabalho é descrito novo sistema reacional para a polimerização do ácido metacrílico em ácido nítrico con-

centrado (65%). Foram escolhidas como variáveis a temperatura, proporção  $MAA:HNO_3$  e o tempo de reação. O peso molecular se apresenta na ordem de  $10^6$ . O mecanismo da polimerização é via radical livre.

É relatada a caracterização dos produtos obtidos através de análise no infravermelho, no ultravioleta, e por espectrometria de ressonância magnética nuclear de carbono 13, viscometria e potenciometria, em comparação com as amostras de poli (ácido metacrílico) estereorregular obtido pelos processos usuais.

## POLY (ISOPRENE) CONTAINING DONOR AND ACCEPTOR PENDANT GROUPS: SYNTHESIS AND PRELIMINARY RESULTS ON SWELLING BEHAVIOUR

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Commercial poly (isoprene), manufactures by COPER-BO, were epoxidized with peracetic acid to obtain degree of epoxidation ca. 10%. One sample of the epoxidized polymers is made to react with carbazole in acidic medium, thus obtaining PISOP<sub>CZ</sub>. Another sample, after complete hydro-

lysis of the epoxide rings, is made to react with chloranil in the presence of sodium hydride, thus obtaining PISOP<sub>ca</sub>.

PISOP<sub>ca</sub> was then crosslinked with 4,4-(4',4'-diphenylmethylene)-bis-1,2,3-triazoline-3,5-dione (BPMTD) at the extent of 1% in toluene.

Cast films were swelled at different temperatures. A sample of pure poly (isoprene), with the same extent of crosslinking, was swollen at the same conditions for comparison.

It was observed that PISOP<sub>ca</sub> solution containing dissolved carbazole the degree of swelling decreased due to a charge transfer (CT) interaction with the chloranil pen-

dant groups in the polymer.

The ratio carbazole: chloranil showed a strong influence on the swelling behaviour of the samples.

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