

CRISTALINIDADE DE POLPA CELULÓSICA BRANQUEADA

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Polpa celulósica de fibras curtas (eucalipto), obtida pelo processo Kraft e branqueada, foi caracterizada quantitativamente quanto à sua fração cristalina (%C) utilizando-se a técnica de difração de raios X e os métodos estabelecidos por Wakelin, Virgin & Crystal (1) (*J. App. Phys.*, 30 (11), 1959), Clark & Terford (2) (*Anal. Chem.*, 27 (6), 888, 1955) e Ant-Wuorinen (3) (*Paperi Ja Puu* 37, 335, 1955). Valores de conteúdo cristalino (%C) para amostras com idêntica seqüência de branqueamento resultaram em 80% (método 1) 46% (2) e 86% (3). As amostras foram preparadas por pastilhamento, aplicando-se uma força de

85KN em pastilhas de 13mm de diâmetro. O efeito da aplicação de tal pressão foi investigado resultando em diminuições de %C inferiores a 10%, para quaisquer dos métodos de difração utilizados, no limite entre 10 e 85 KN. O efeito de moagem da polpa em estudo, em moinho de bolas (cerâmica) foi estudado utilizando-se os métodos 2 e 3. Pelo primeiro, após 10 horas de moagem a %C reduz-se a zero, enquanto pelo método 3 seriam necessárias somente 5 horas.

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CROSSLINKING OF POLY-DIENES IN SOLUTION

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The use of the EN-reaction of Bis-1,2,4-triazoline-3,5-diones with polymers containing allyl-structures, to synthesize elastomer networks of defined functionality is investigated.

The general synthetic route for the synthesis of the cross-linkers is discussed. The structure of the crosslinker is varied with respect to different reactivities and spatial properties of the crosslinker.

In solution crosslinking processes the formation of elastically ineffective loops plays an important role. The stiffness of the rodlike crosslinker molecules may influence the ratio of effective crosslink sites to ineffective loops.

Preliminary kinetic experiments for a flexible and a stiff triazolone-derivative are discussed as well as the different behaviour of butyl-rubber.

The resulting elastomer networks are characterized with respect to the mechanical and swelling behaviour.

These techniques allow an estimation of the crosslinking efficiency and the entanglement spacing for butyl rubber and polybutadiene. The obtained data are compared with results from other techniques.

Acknowledgements: FINEP, PROPESP, STIFTUNG VOLKSWAGENWERK

SUGAR CANE BAGASSE-LIGNIN AS STABILIZER FOR ELASTOMERS

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Stabilizers used by the rubber industry frequently belong to the hindered phenol class. The most common one is 2,6-di-tert-butyl-p-hydroxytoluene (BHT), which is used in association with a N,N'-bis-dialkyl-p-phenylenediamine (NPD). The mechanism of stabilization of BHT involves the formation of a phenoxy radical which scavenges the ma-

croperoxy radicals, with formation of quinones (G. Scott and M. Fauzi-Yusoff, *Polim. Degrad. and Stab.* 3, 13(1980-81)). NPD is used as synergist with BHT, regenerating it to a certain extent (L. Tainer and J. Pospisil, *Polym. Degrad. and Stab.*, 8, 23(1984)). Recent work have demonstrated that Lignin form phenoxy radicals when exposed to radia-

tion or heat (D.N.S. Hon in "Developments in Polymer Degradation-3", N. Grassie ed., Applied Science, Essex (1981) p. 229). On the other hand, a recent structure determination of Sugar Cane Bagasse-Lignin (SCB-lignin) demonstrated the presence of hindered phenols, where the t-butyl groups of BHT are substituted by methoxy or bulkier groups (M.F. Brito de Souza, MSc Dissertation, Unicamp, 1984).

In this work we studied the photochemical, thermal (100°C) and environmental degradation of butadiene rubber (BR), styrene-butadiene rubber (SBR) and natural rubber (NR) stabilized with different concentrations of SCB-lignin in the pure form or associated with NPD. These results were compared with pure unstabilized and commercial stabilized rubber samples.

A stabilization effect was observed for all rubbers tested. Comparing different SCB-lignin concentrations it is observed that a lower concentration can be used to prevent the ther-

mal degradation in comparison to the photochemical degradation. For example, the induction period (IP) for the photodegradation of BR containing 10.0% of SCB-lignin is 0.23 times the IP for a commercial sample, while in the thermal degradation the IP's are equaled with 1.3% of SCB-lignin. Association of SCB-lignin with NPD indicates a synergistic effect similar to BHT. For SBR the substitution of BHT by SCB-lignin in the commercial sample formulation (0.62% BHT/0.007% NPD) increased 5.6 times the IP for the thermal degradation. The chemical stabilization effect of SCB-lignin is due to the presence of hindered phenol extremities in the macromolecule, but its main advantage is the reduced mobility in the rubber matrix preventing losses by volatilization.

Acknowledgements: FAPESP (Fellowship for L.T.F. nº 84/0582-5 and Grant nº 83-0389-8) and PADCT/FINEP.