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Antiswelling and Frost-Resistant Properties of a Zeolite-Modified Rubber Mechanical Seal at Low Temperature

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Abstract

The blending of an activated zeolite with a butadiene nitrile-based rubber was investigated as a potential means of achieving mechanical seals suitable for low-temperature operation. Through this, it was discovered that zeolite addition increases the oil and frost resistance of the rubber, as well as improves the climatic stability of the elastomer in a hydrocarbon medium. These improvements are attributed to both physical and chemical interactions, with the presence of zeolite inducing strong crosslinking during vulcanization and increasing the absorption of additives such as plasticizers. Rubber modified in this way is therefore recommended for use with hydrocarbon liquids exposed to cold climates. Swelling test was conducted over 2 years in the ambient atmosphere. Zeolites induced the strong crosslinking during vulcanization of rubbers and the adsorption of plasticizers or other ingredients of rubber blends onto zeolites were also strengthened.

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