

NATURAL RUBBER AS A MODIFIER OF ACRYLONITRILE-BUTADIENE RUBBER/POLY (VINYL CHLORIDE) BLENDS

Acrylonitrile-butadiene rubber (NBR) is resistant to non-polar solvents and to oils, but not to ozone. Therefore, it is useful to blend NBR with poly (vinyl chloride) (PVC) to make blends which may have more desirable properties at lower cost (Dunn, 1982). However, incorporation of PVC decreases the elasticity of NBR. In order to increase the elasticity of NBR/PVC blends, George *et al.*, (1987) and Zheng *et al.*, (1988) attempted addition of natural rubber (NR), styrene-butadiene rubber (SBR), or butadiene rubber (BR) to make ternary blends.

George, *et al.*, (1987) using an elemental sulphur/N-cyclohexyl-2-benzothiazyl sulphenamide based vulcanizing system, have observed that NR, SBR, or BR can replace NBR in a 70/30 NBR/PVC blend for improvements in tensile properties, resistance to polar solvents and for economic advantage. Among the three rubbers, SBR could be added in larger amounts than NR or BR. The authors have explained this difference on the basis of the slightly greater compatibility of SBR with PVC than that which they have observed for NR and BR by a rheology analysis of the blends on a Brabender Plasticorder. Zheng *et al.*, (1988) studied a 70/20/30 NBR/PVC/BR blend by DSC and SEM methods and found them compatible and explained this finding by the known compatibility of NBR with PVC (Utracki, 1984) and by an expected compatibility of NBR with BR caused by crosslinks formed from bivinyl links in

NBR and the structural units in BR. Even this explanation is not in accordance with the results of George *et al.*, (1987). Hence the idea of relation between crosslinking and compatibility can be verified by a study of covulcanized NBR/PVC/NR (SBR, BR) blends which is the objective of the present work.

NBR : Krynac 34.50 (34 per cent acrylonitrile, Mooney viscosity, ML (1+4) 100°C, 50) Polymer Corporation, Sarnia, Canada.

PVC : Neralit S 6057 (Powder, suspension polymer, K value, 60) Spolana, Neratovice, Czechoslovakia.

NR : SMR-5 (Mooney viscosity ML (1+4) 100°C, 61) Malaysian Rubber Research and Development Board.

SBR : Krallex 1500 (23.5 per cent styrene, Mooney viscosity, ML (1+4) 100°C, 50) Kaucuk, Kralupy and Vltavou, Czechoslovakia.

BR : SKD (96 per cent cis-1, 4, Mooney viscosity, ML (1+4) 100°C, 52).

Tetramethylthiuram disulphide (TMTD) : Hermat TMT, as supplied by CHZJD, Bratislava, Czechoslovakia.

Zinc oxide : Silver Seal zinc oxide, as supplied by Farby a Laky, Koseca, Czechoslovakia.

Stearic acid : Stearin, as supplied by STZ, Usti nad Labem, Czechoslovakia.