

## **The effect of feldspar loading on curing characteristics, mechanical properties, swelling behaviour and morphology of natural rubber vulcanizates**

### **Abstract**

Feldspar is being used herein as a filler in natural rubber vulcanizates. Two different types of natural rubber, SMR L and ENR 50 having 0 and 50 mol% of epoxide groups and semi-efficient vulcanization were used. The scorch time, ( $t_2$ ) and cure time, ( $t_{90}$ ) of both rubber vulcanizates slightly increased with increasing feldspar loading. At a similar feldspar loading, the ENR 50 vulcanizates showed shorter  $t_2$  and  $t_{90}$  than SMR L vulcanizates. Besides  $t_2$  and  $t_{90}$ , maximum torque, ( $M_{HR}$ ) and torque difference ( $M_{HR} - M_L$ ) were also investigated. Results indicate that  $M_{HR}$  and  $M_{HR} - M_L$  increase for both rubbers with increasing feldspar loading. Swelling test results showed a reduction in the swelling percentage for both rubbers with increasing feldspar loading. At a similar filler loading, SMR L vulcanizates showed lower swelling percentage than ENR 50 vulcanizates. The mechanical properties such as tensile strength (up to certain filler loading), tensile modulus and hardness increased with increasing feldspar loading for both rubbers. However, at a similar feldspar loading, the mechanical properties of SMR L vulcanizates are higher than ENR 50 vulcanizates.

**Keywords** — curing characteristics, feldspar, mechanical properties, natural rubber, swelling behaviour.