

# **Effect of interlocking between porous epoxy microparticles and elastomer on mechanical properties and deformation modes**

## **Abstract**

To investigate the interlocking capability of porous epoxy microparticles (PEM) with elastomers, composites of PEM and ENR/NR were prepared on a two-roll mill. A proprietary method was used to produce the PEM, which have multiple microholes in their surfaces. By establishing an interlocking mechanism with the elastomer, the PEM have potential for use as an advanced reinforcing filler. It was found that the PEM caused faster vulcanisation of the ENR and NR composites. The advanced interlocking mechanism led to enhancement of the M100 and M300 moduli as well as a slight increase in the elongation at break of the ENR and NR composites. However, the tensile strength only showed improvement for the ENR and NR composites filled with hybrid filler (PEM<sub>Ca</sub>). Furthermore, enhanced tear strength was achieved, and two types of deformation modes were evident during tensile testing: breakage at the interlocking neck and pulling out of the interlocked rubber.