

First outcomes of the RE-FOAMS project: end-of-life PVC foams as fillers for EPDM rubber.

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Rigid crosslinked interpenetrated network polyvinyl chloride (PVC) foams are widely used as core materials in the composite industry. Nevertheless, no recycling methods exist today for these materials which are currently landfilled at the end of life (EoL). In this work, various amounts of EoL PVC crosslinked foams in the form of chips were melt compounded with ethylene-propylene diene monomer (EPDM) rubber at 60 °C for 15 min. The obtained rubber mixtures were vulcanized at 160 °C for 20 min to create compacted square sheets of EPDM/PVC composites using compression molding technique. Tensile tests revealed a progressive increase in modulus of EPDM with increasing PVC content while a subsequent decrease of the elongation at break values of the composites was noticed. Scanning electron microscopy revealed a homogeneous dispersion of PVC particles with the EPDM matrix. In addition, a better interfacial adhesion of filler in the matrix was observed at higher PVC content as well. Hardness tests revealed an increased shore A values by 25% with added 20% and 30% of PVC by weight in EPDM. Concurrently, a steady increase of compression set was observed in the rubber composites with the added PVC filler. Additionally, with such addition of filler, thermal conductivity was decreased by 35% compared to pure EPDM, as verified by heat flow meter tests as shown in the following figure.

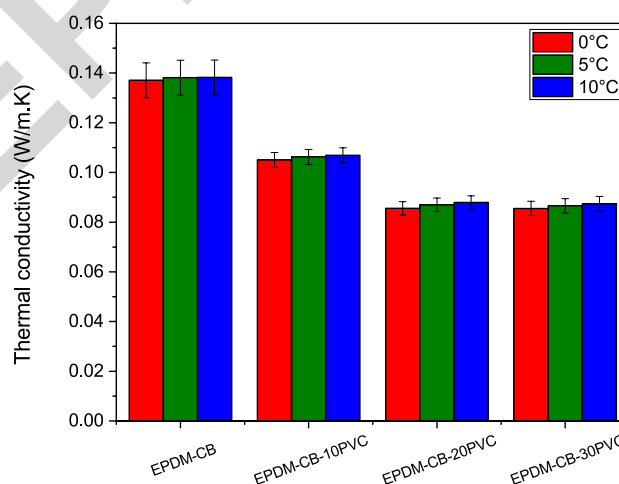


Figure: Thermal conductivity of compacted EPDM-CB and relative EPDM-CB-PVC composites measured by heat flow meter.

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