

Electronic Supplementary Material (ESI) for RSC Advances.

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Supporting Material for

Highly exfoliated montmorillonite clay reinforced thermoplastic polyurethane elastomer: in-situ preparation and efficient strengthening

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To better understand the role of MDI-MMT on the mechanical properties of the composites, in-situ synthesized TPU samples with small amount of pristine MMT as fillers were also prepared with similar method as MDI-MMT enhanced TPU composites. However, the in-situ synthesized TPU samples with small amount of pristine MMT as fillers was easy to produce gel phenomenon (Fig.1) in the synthesis process, and the mechanical properties of the obtained samples significantly decreased as compared with those of neat TPU (Fig.2).

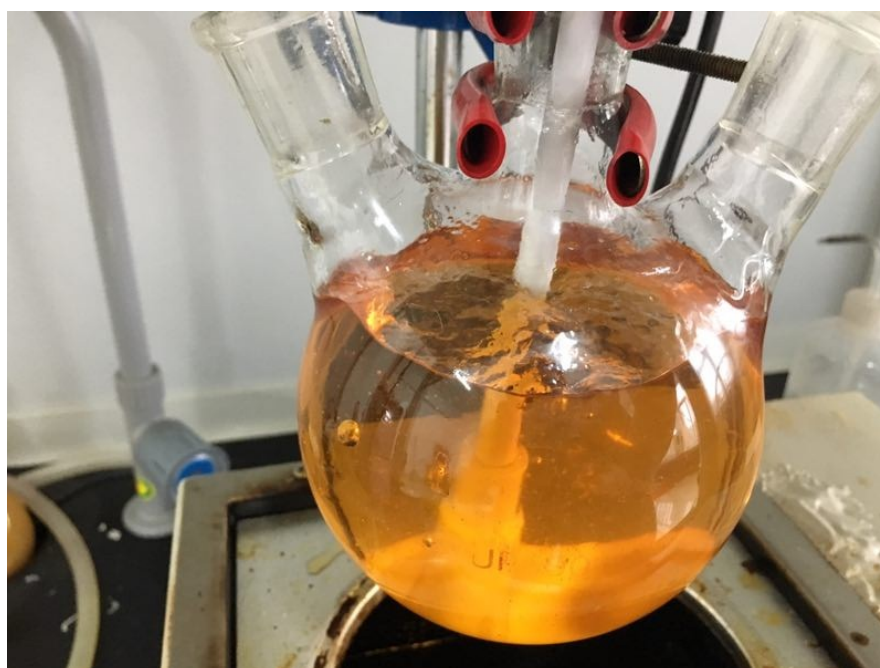


Fig.1. Gelation phenomenon observed in the experiment for the preparation of pristine MMT strengthened TPU.

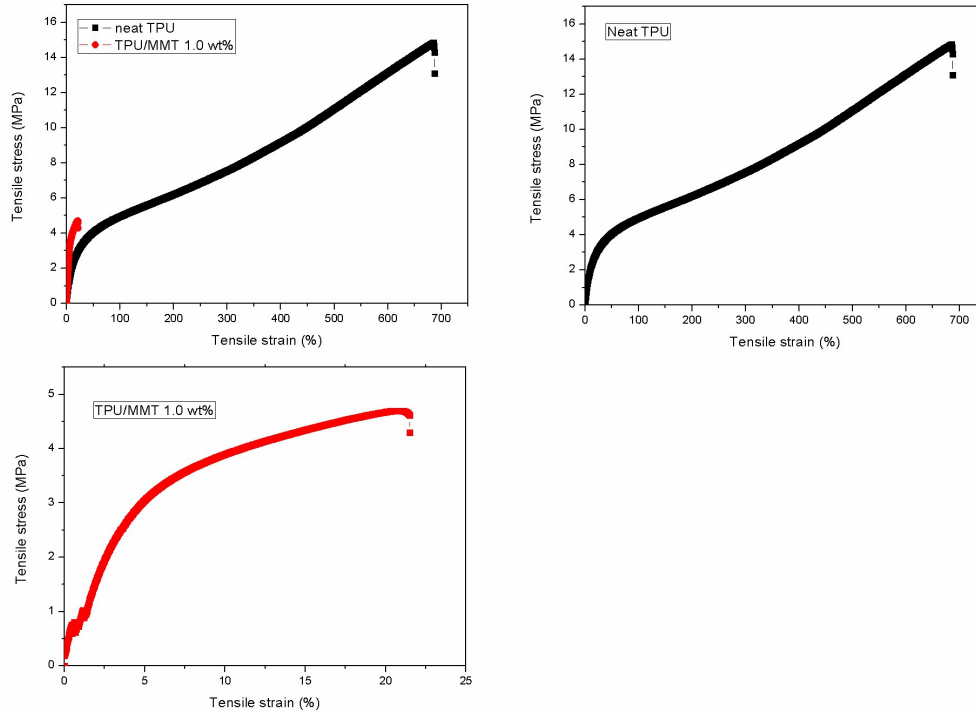


Fig.2. Stress-strain dependences of neat TPU and the TPU/MMT nanocomposite containing 1.0 wt.% unmodified Na-MMT.

From Fig.2, it could be seen that mechanical properties of the sample obtained by an in-situ polymerization with unmodified MMT significantly decreased as compared with those of neat TPU. Possibly the interlayer water of MMT reacted with -NCO to form urea. Thus the incorporation of pristine MMT into a polymer matrix didn't improve the mechanical properties of the composites.