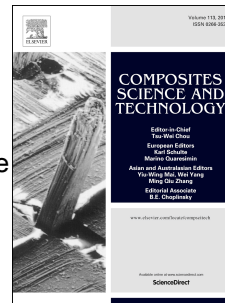


# Accepted Manuscript

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PII: S0266-3538(18)30793-0

DOI: [10.1016/j.compscitech.2018.08.024](https://doi.org/10.1016/j.compscitech.2018.08.024)

Reference: CSTE 7357

To appear in: *Composites Science and Technology*

Received Date: 4 April 2018

Revised Date: 26 July 2018

Accepted Date: 18 August 2018

Please cite this article as: Lin S, Li B, Chen T, Yu W, Wang X, Mechanical reinforcement in poly(propylene carbonate) nanocomposites using double percolation networks by dual volume exclusions, *Composites Science and Technology* (2018), doi: 10.1016/j.compscitech.2018.08.024.

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## Mechanical Reinforcement in Poly(propylene carbonate) Nanocomposites Using Double Percolation Networks by Dual Volume Exclusions

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**ABSTRACT:** Poly(propylene carbonate) (PPC) nanocomposites with poly(lactic acid) (PLA) and sepiolite nanofibers (NF) double percolation networks were prepared according to the dual volume exclusions principle. A two-step melt mixing with annealing process was adopted to construct the double percolation networks, which were verified by rheological and morphological characterization. The formation of double percolation networks structure effectively increased both the mechanical properties and heat resistance of PPC due to the greatly improved efficiency of the formation of force transferring network of NF. As a result, the PPC/PLA/NF ternary nanocomposites with double percolation networks exhibited elastic modulus about three orders higher than that of the pure PPC at 100 °C. The thermal deformation temperature, evaluated from the modulus at the glass transition of pure PPC (0.1 GPa), was found to be above 100 °C.

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