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Nanocellulose Dispersion in Melt-Processed Polymers Without Water or Solvent Introduction During Processing

A novel solvent-free technique utilizes existing plastic additives to achieve homogenous dispersion of nanocellulose into various melt-processed polymers, enabling a wide range of additive concentrations.

Researchers at Purdue University have shown that nanocellulose of various types can be dispersed into plastic without the introduction of solvents of any variety during melt processing. By preparing nanocellulose/additive formulations through solvent exchange techniques, nanocellulose can be exchanged into a second material which would typically be used in commercial processes anyways. This allows very good dispersion of nanocellulose into various melt-processed plastics to be achieved without, solvents, or significant pre-processing of nanocellulose and with or without chemical modification. This method puts nanocellulose into solid or liquid additives for plastic and very small to relatively high additive concentrations of nanocellulose can be achieved in the bulk plastic. This technique could be applicable to a wide variety of polymers including nylons (heavily used in the automotive industry), polylactic acid and polypropylene (food packaging).

Advantages:

-Wide range additive concentration of nanocellulose

-Solvent free incorporation of nanocellulose

-Homogenous mixture of hydrophobic and hydrophilic polymer

Potential Applications:

-Large scale polymer production

-Hot melt extrusion

TRL: 4

Intellectual Property:

Technology ID
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Category
Chemicals & Advanced Materials/Polymer Science & Smart Materials
Materials Science & Nanotechnology/Nanomaterials & Nanostructures
Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

Authors
Caitlyn Clarkson
Jeffrey P Youngblood

Further information
Dipak Narula
dnarula@prf.org

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