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Artur P. Terzyk, Emil Korczeniewski

Faculty of Chemistry, Physicochemistry of Carbon Materials Research Group, Nicolaus Copernicus University in Toruń, Gagarin Street 7, 87-100 Toruń, Poland
E-mail: aterzyk@chem.umk.pl

Does the Snow Queen Like Black? Nanocarbon-Reinforced THV-Based Anti-Icing Sponges

New superhydrophobic, anti-icing tetrafluorethylene-hexafluorpropylene-vinylidenfluoride terpolymer (THV)-based materials: nonporous solids as well as porous sponges were created and deeply characterized. Single Walled Carbon Nanohorns (SWCNHs), biosilica (BS) as well as carbonized biosilica (CB) were applied as fillers. For all materials thermal resistance is improved after the addition of fillers, but among the studied samples only for the sample containing SWCNHs the application of Joule heating to reinforce anti-icing properties is possible. Introduction of SWCNHs to THV causes the improvement of anti-icing properties. The most important conclusion of the complex study (around 100 samples altogether) is that the creation of mechanically resistant THV-SWCNHs-containing sponges is the most promising strategy in modern anti-icing science leading not only to enhancement of the compression Young's modulus and the time to recalescence, but also to the drop of freezing temperature.

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1) Korczeniewski E. et al., *Composites B*, **295**, 112153 (2025).