

Extended Abstract

Novel Formulations of PEG–Silica Phase-Changing Materials (PCMs) with Applications in Passive Storage of Thermal Energy [†]

Cătălin Ionuț Mihăescu *, Cristina Lavinia Nistor, Cristian Petcu, Raluca Ianchiș, Claudia Mihaela Ninciuleanu, Elvira Alexandrescu and Cristina Scamoroscenco

National Institute for R&D in Chemistry and Petrochemistry ICECHIM—Bucharest, Spl. Independentei 202, 6th District, 0600021 Bucharest, Romania; lc_nistor@yahoo.com (C.L.N.); cpetcu@icf.com (C.P.); ralumoc@yahoo.com (R.I.); claudia.ninciuleanu@yahoo.com (C.M.N.); elviraalexandrescu@yahoo.com (E.A.); scomoroscencocristina@gmail.com (C.S.)

* Correspondence: mihaescu_catalin96@yahoo.com; Tel: +40-723 183-903

[†] Presented at the 15th International Symposium “Priorities of Chemistry for a Sustainable Development” PRIOCHEM, Bucharest, Romania, 30th October–1st November 2019.

Published: 15 October 2019

Keywords: thermal energy storage; phase-changing materials; PEG-silica hybrids; latent heat storage; polycrystalline polymers

The aim of the present study is to design new PEG–silica hybrids (PEG_x–Si) as phase changing materials that can be integrated into construction elements for green buildings with positive impacts on different aspects such as saving of primary energy (expensive energy), reduction of maintenance costs (economic aspect), and increasing the thermal comfort of the inhabitants (environmental aspects) [1]. In order to prevent PEG’s flow or solubilization, it needs to be stabilized or incorporated in different matrices while retaining its thermal energy storage capacity [2]. Our approach to overcome these problems consists in the covalent bonding of a fraction of PEG chains to an in situ generated silica network, forming the so-called PEG–silica hybrid systems. (Figure 1).

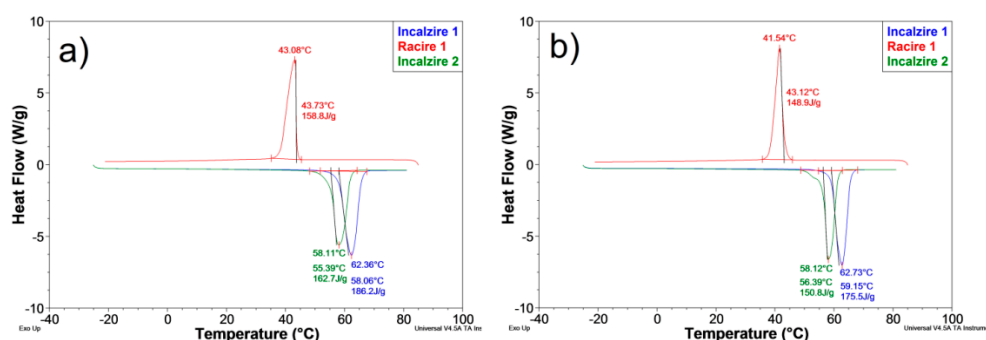


Figure 1. DSC curves of mixtures of PEG₄₀₀₀–Si with (a) PEG₄₀₀₀ and (b) PEG₆₀₀₀ at a 1:1 ratio (grav.).

Acknowledgments: This work was supported by a grant of the Romanian Ministry of Research and Innovation, CCCDI—UEFISCDI, project number PN-III-P1-1.2-PCCDI-2017-0428, contract 40PCCDI/2018, within PNCDI III and by Romanian Ministry of Research and Innovation—MCI through INCDCP ICECHIM Bucharest 2019–2022 Core Program PN. 19.23—Chem-Ergent, Project No. 19.23.02.01.

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