

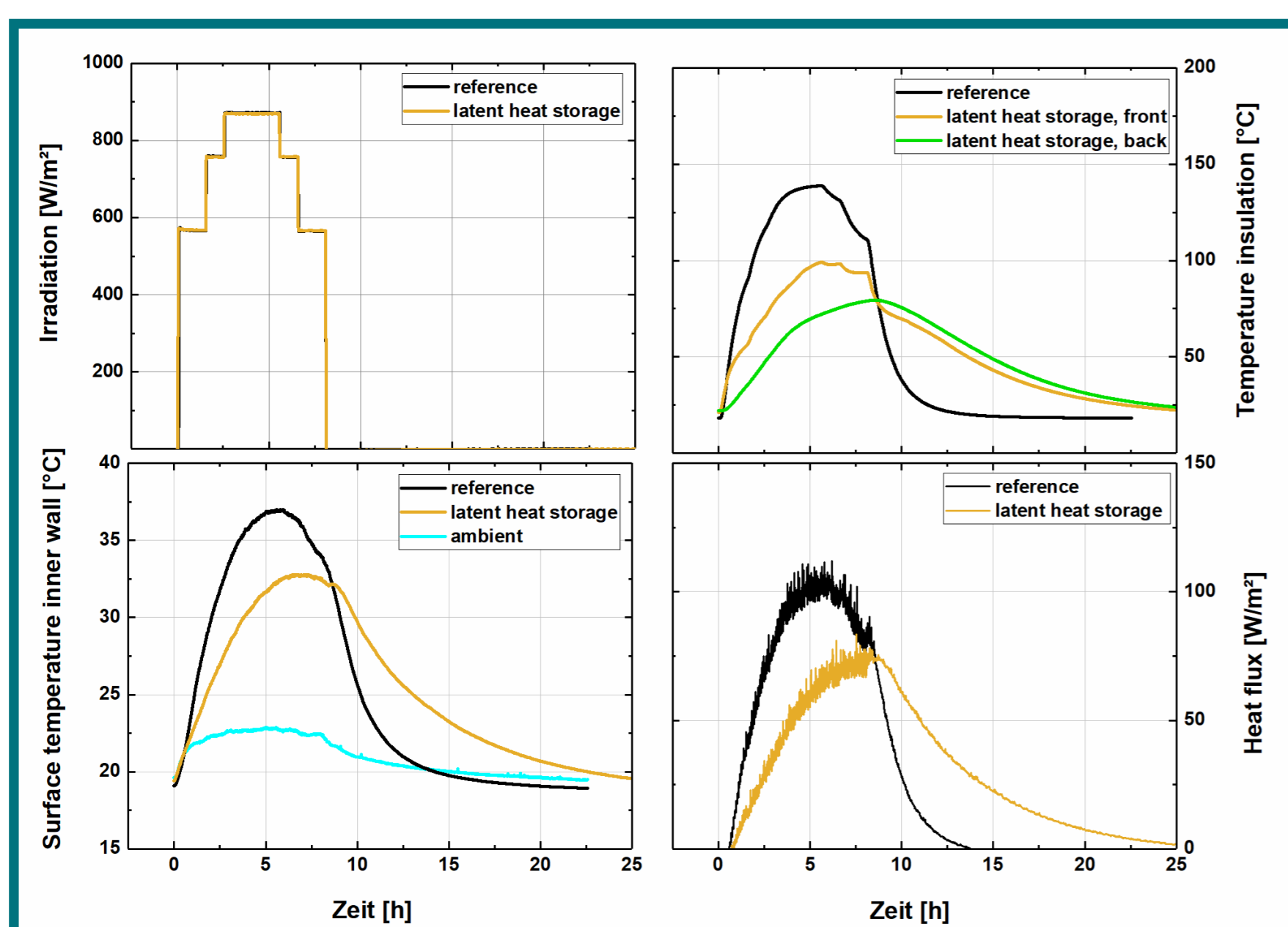
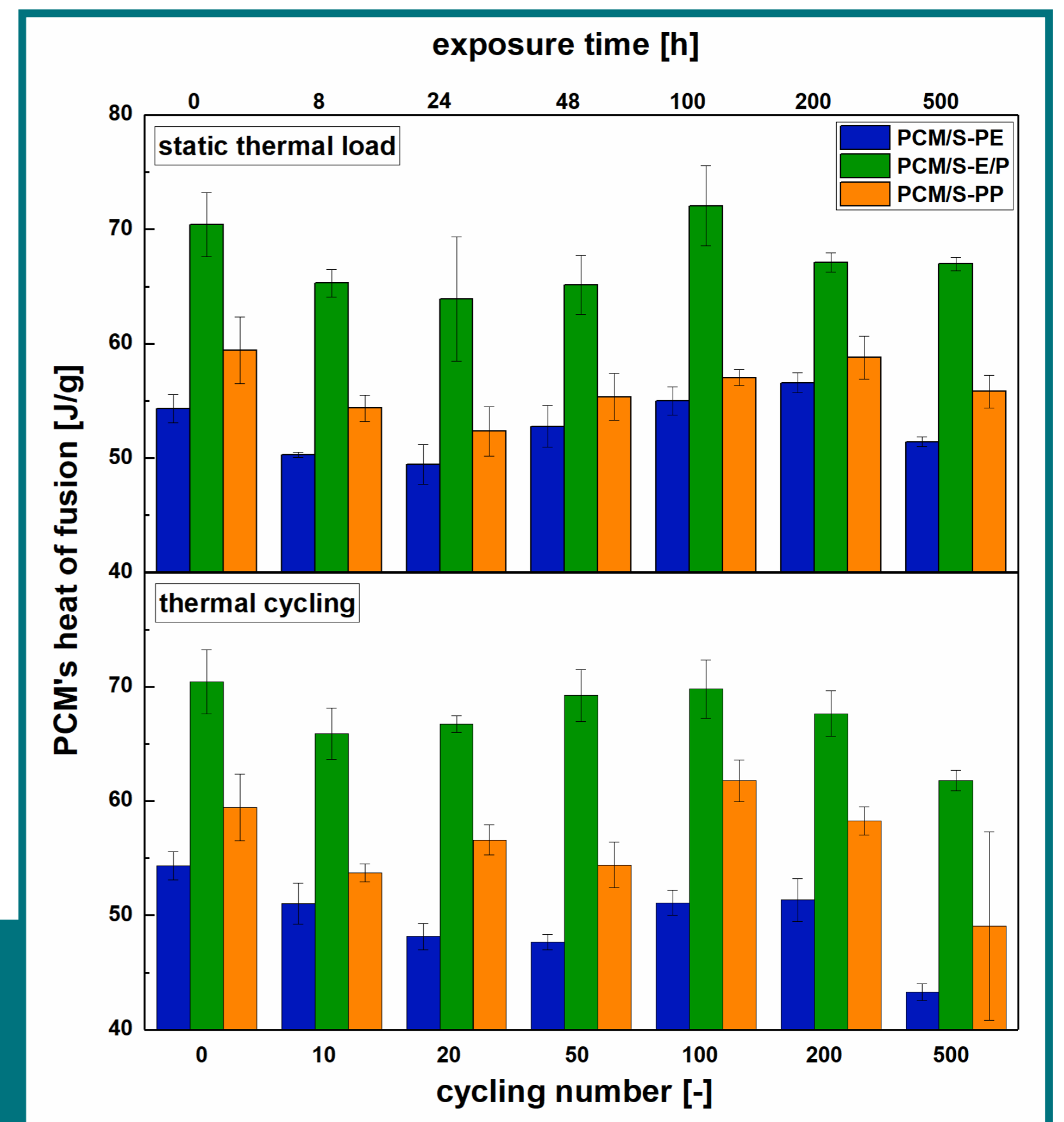
Functional polymers for an efficient energy management of buildings

Katharina Resch-Fauster

High temperature latent heat storages based on paraffin-polymer compounds

Shape-stabilized latent heat storages with phase change temperatures $>60\text{ }^{\circ}\text{C}$ were manufactured by industrial compounding of various polyolefin matrix materials (PE, E/P and PP) and paraffin waxes as phase change materials (PCM). A comprehensive analysis of the material's polymer-physical characteristics revealed its high long-term stability in terms of latent heat storage capacity, morphology and mechanical properties (Fig. 1). Moreover, the functional material is cheap and easy to produce in any size and geometry by applying conventional polymeric processing techniques and can thus be easily integrated in any type of structure (wide range of possible applications).

Fig. 1. The latent heat storage capacity (i.e. PCM's heat of fusion) is neither affected by a long-term exposure to static thermal load (i.e. storage in charged state) nor by thermal cycling (i.e. charging and discharging of storage).



An application demonstration was done in a prototype façade element equipped with an integrated solar thermal collector whereas a latent heat storage panel was integrated in the collector's insulation. Solar simulator testing revealed that the developed latent heat storage protects the building's interior efficiently from overheating (Fig. 2).

Fig. 2. Overheating protection efficiency of the developed latent heat storage. Even at a harsh solar irradiation, the inner surface and interior air temperatures of the building do not exceed comfort levels. The latent heat storage discharges and regenerates fully during the night.



KATHARINA RESCH-FAUSTER

Materials Science and Testing
of Polymers

katharina.resch-fauster@unileoben.ac.at

RESEARCH FOCUS: Innovative polymers for sustainable energy production and storage, green engineering with polymeric materials, polymers and composites based on renewable resources, end-of-life scenarios and recycling technology

PROJECT: Poly2Facade - Innovative thermisch selbst regulierende Solarfassaden durch den Einsatz funktionaler Polymere

PROJECT PARTNERS: Montanuniversität – Department of Polymer Engineering and Science, Austrian Institute of Technology, Forschungszentrum für integrales Bauwesen AG, Polymer Competence Center Leoben GmbH

FUNDING: This research project was carried out within the framework of the program Haus der Zukunft Plus under grant Nr. 833717. Haus der Zukunft Plus is a science and technology program of the Austrian Ministry of Traffic, Innovation and Technology. It is operated on behalf of the pint in cooperation with Austria Wirtschaftsservice Gesellschaft mbH and Österreichische Gesellschaft für Umwelt und Technik ÖGUT.