

Modeling of the photo-crosslinking process in semi-crystalline polymer networks

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Abstract

Photo-cross-linking represents a fast and efficient approach to obtain chemically crosslinked polymer networks starting from photo-crosslinkable free polymer chains and photo-initiator molecules. Notably, the physical, mechanical, and functional properties of these materials are highly affected by the photo-cross-linking process. This work aims to propose a theoretical framework to describe and characterize UV-induced photo-crosslinking in semi-crystalline polymer networks. Numerical results are validated against data obtained from an experimental campaign on homopolymer networks subjected to different photo-crosslinking conditions. The results show how to optimize photo-crosslinking parameters to increase efficiency and establish a foundation for future coupling with thermo-mechanical constitutive models. Acknowledgments. This work was funded by the European Union ERC CoDe4Bio Grant ID 101039467. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Council. Neither the European Union nor the granting authority can be held responsible for them.

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