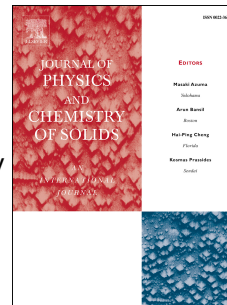


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Impact of disorder on formation of free radicals by gamma-irradiation: multi-frequency EPR  
studies of trehalose polymorphs

Iva Saric<sup>1\*</sup>, Jurica Jurec<sup>2</sup>, Edward Reijerse<sup>3</sup>, Boris Rakvin<sup>2</sup>, Marina Kveder<sup>2</sup>

[iva.saric@uniri.hr](mailto:iva.saric@uniri.hr), [Jurica.Jurec@irb.hr](mailto:Jurica.Jurec@irb.hr), [edward.reijerse@cec.mpg.de](mailto:edward.reijerse@cec.mpg.de), [Boris.Rakvin@irb.hr](mailto:Boris.Rakvin@irb.hr),

[Marina.Ilkovic.Kveder@irb.hr](mailto:Marina.Ilkovic.Kveder@irb.hr)

<sup>1</sup>*Department of Physics and*

<sup>1</sup>*Center for Micro- and Nanosciences and Technologies, University of Rijeka,*

*Radmile Matejčić 2, 51000 Rijeka, Croatia*

<sup>2</sup>*Ruder Bošković Institute, Division of Physical Chemistry, Bijenička 54, 10000 Zagreb,*

*Croatia*

<sup>3</sup>*Max Planck Institute for Chemical Energy Conversion, Stiftstrasse 34-36, 45470 Mülheim an*

*der Ruhr, Germany*

## Abstract

Electron paramagnetic resonance (EPR) studies of the radiation-induced radicals in two anhydrous trehalose polymorphs, beta-crystalline (TRE<sub>c</sub>) and glassy (TRE<sub>g</sub>), were conducted with the aim to resolve whether different types of free radicals are induced in a differently disordered environment. A multifrequency approach (9.5 GHz, 94 GHz, and 244 GHz) was applied to improve the *g*-tensor resolution of the complex EPR spectra. In addition, the thermal stability of the EPR spectra and the respective decay kinetics were analyzed in a series of thermal annealing studies in the temperature interval from 333 K to 363 K. It was found that in the crystalline matrix the transformation process of the induced radicals is more complex than in the glassy host matrix. Qualitative decomposition of the experimental

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