chemisch
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gesellschaft

Gegründet im Jahre 1869 von H. Hlasiwetz, J. Loschmidt, J. Petzval und J. Stefan

EINLADUNG

zum Vortrag von

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Photo-Induced Radical Polymerization: Insights and Applications

am

Dienstag, 3. März, um 17:30 Uhr

Ort: Lise-Meitner-Hörsaal, Fakultät für Physik, Universität Wien,
1090 Wien, Strudlhofgasse 4 / Boltzmanngasse 5, 1. Stock

Barrierefreier Zugang: Boltzmanngasse 5, Lift, 1. Stock rechts über den Gang zum Hintereingang des Hörsaals

Abstract

This talk gives an insight into light-induced radical polymerization, a highly relevant method for the production of polymers in many industrial fields. The aim of the presented work was to obtain an enhanced understanding of the initiation mechanism of the polymerizations, in order to (a) develop novel photoinitiators for specific applications, e.g. dentistry, and (b) design computer-based models for predicting the outcome of the polymerizations considering various side reactions.

A major project was the photochemical investigation of germanium-based photoinitiators for the application in dental composites. The photoinitiator directly influences the depth of cure, curing time, material properties and aesthetic appearance of dental composites. State-of-the-art dental composites contain a bisacylgermane as a photoinitiator. In this work, an in-depth comparative study of the photoinitiating efficiency of mono- to tetraacylgermanes has been performed, focusing on wavelength-dependent photobleaching behavior, decomposition quantum yields and reactivity of primary radicals. The aim was establishing a systematic relationship between the structure of the photoinitiators and their reactivity.

Another main project deals with phosphorus-based photoinitiators and their initiation efficiency and reaction mechanisms in aqueous solution polymerizations. Understanding the photochemistry of these initiators in aqueous media is essential for their application in biomedicine or 3D printing.

Experimental data were obtained using optical spectroscopy (UV-Vis), laser-flash photolysis (LFP), time-resolved and continuous-wave electron paramagnetic resonance (TR-EPR and CW-EPR), chemically-induced dynamic nuclear polarization (CIDNP) NMR, mass spectrometry (MS) and size exclusion chromatography (SEC). Additionally, models of the initiation step of radical polymerizations have been developed using the determined experimental data, in order to design a simple tool for classifying and predicting photoinitiator efficiencies.

Kaffee und Getränke werden bereitgestellt