

Tetraacylgermanes: A novel PI system

Nina Jungwirth¹, Judith Radebner¹, Anna Eibl², Harald Stueger^{1,2}

¹ Graz University of Technology, Institute of Inorganic Chemistry, 8010 Graz, Austria

² Graz University of Technology, Institute of Physical and Theoretical Chemistry, 8010 Graz, Austria

E-mail: nina.jungwirth@student.tugraz.at

Based on our recent findings on the synthesis of previously unknown tetraacylgermanes, investigations on the mechanism of the newly established synthetic pathway were conducted. As shown in Fig. 1 three methods for the formation of tetraacylgermanes **1** were developed. Contrary to the results obtained with acid chlorides (Method A), the use of acid fluorides (Method B) or presence of excess potassium fluoride (Method C) lead to the exclusive formation of the corresponding tetraacylgermane.

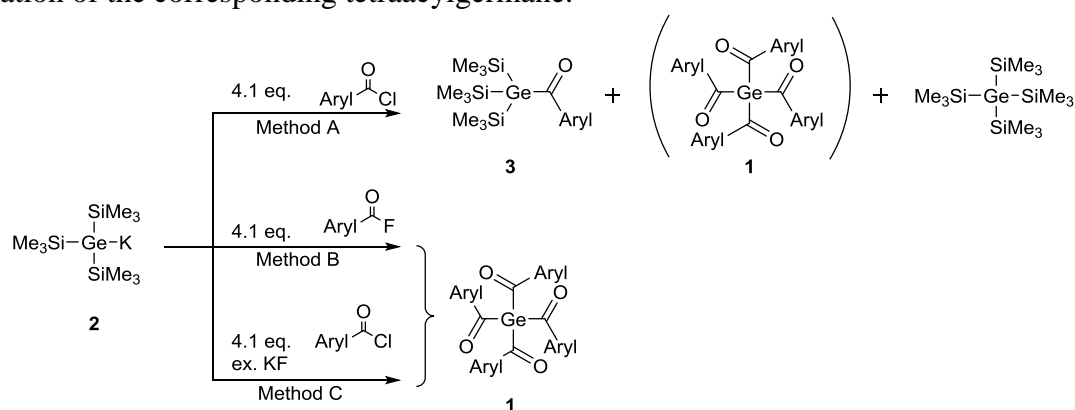


Figure 1. Synthesis of tetraacylgermanes **1**.

NMR-spectroscopy in combination with single crystal X-ray diffraction allowed full characterization of all prepared tetraacylgermanes. UV-Vis spectroscopy revealed absorption maxima in the range of 400 nm. The low toxicity and fast photobleaching of **1** compared to the frequently applied phosphorous-based PIs^[1] demonstrate the superior potential as highly efficient photoinitiators for free-radical polymerization, especially for their use as PIs in dental filling materials.^[2] This behavior could be proven by sophisticated physiochemical experiments. A set of different substituted tetraacylgermanes as well as a closer look on the performance of this novel PI system will be presented.

Acknowledgement: We thank Ivoclar Vivadent AG and NAWI Graz for financial support.

References:

- [1] H. Grützmacher, J. Geier, D. Stein, T. Ott, H. Schönberg, R. H. Sommerlade, S. Boulmaaz, J. P. Wolf, P. Murer, T. Ulrich, *Chimia*, **2008**, 62, 18.
- [2] J. Radebner, et al., *Angewan. Chem. Int. Ed.*, **2017**, 56, 1-6 (ahead of print), DOI: 10.1002/anie.201611686.