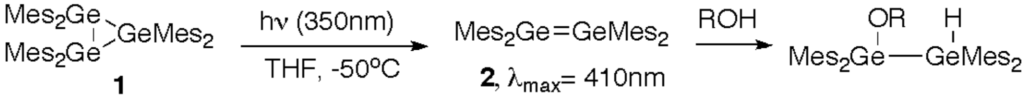
Stopped-flow Kinetic Studies of the Reactions of Tetramesityldigermene with Alcohols

Laura J. Smith, Ian R. Duffy, William J. Leigh

Department of Chemistry and Chemical Biology, McMaster University (McGill)

While the reactivities of heavier group 14 multiply bonded compounds have been examined, less is known about the kinetic and mechanistic aspects of these reactions. Photolysis of hexamesitylcyclotrigermane (**1**) in THF generates tetramesityldigermene (**2**), a water and oxygen-sensitive yet stable compound, observable through UV-Vis spectrophotometry (λ_{max} = 410 nm).[1] In this work, the kinetics of the reactions of **2** with various alcohols have been studied using stopped-flow kinetic methods under anhydrous and anaerobic conditions.



Investigations of the reaction of **2** with methanol and ethanol in THF have revealed rate constants of 0.156 ± 0.005 M^{-1} s^{-1} and 0.08 ± 0.01 M^{-1} s^{-1} respectively. Reactions with MeOD have shown a kinetic isotope effect of $k_H/k_D = 2.7 \pm 0.1$ suggesting the involvement of a hydrogen transfer in the rate-determining step. The results of this work have been compared to previous studies of the reactivity of tetramesityldisilene, the Si analogue of **2**, with alcohols.[2]

---

[1] Hurni, K. L.; Rupar P. A.; Payne, N. C; Baines, K. M. *Organometallics*, **2007**, 26, 5569-5567.

[2] Apeloig, Y; Nahask, M. *Organometallics*, **1998**, 17, 2307-2312.