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Phosphorus, Sulfur, and Silicon and the Related Elements

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713618290>

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To cite this Article Mahmoudkhani, Amir H. , Langer, Vratislav and Lindqvist, Oliver(1999) 'Radical Addition of Bis(Trimethylsilyl)Phosphonate to Vinyltrimethylsilane: Crystal Structure of (2-Trimethylsilylethyl)Phosphonic Acid', *Phosphorus, Sulfur, and Silicon and the Related Elements*, 147: 1, 231

To link to this Article: DOI: 10.1080/10426509908053596

URL: <http://dx.doi.org/10.1080/10426509908053596>

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Radical Addition of Bis(trimethylsilyl)Phosphonate to Vinyltrimethylsilane: Crystal Structure of (2-Trimethylsilylethyl)Phosphonic Acid

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The formation of phosphorus–carbon bond by free radical addition of phosphorus compounds containing P–H bond to olefins has been known since more than three decades ago. Alkyl or aryl phosphines, phosphinates, phosphonates and phosphorus or hypophosphorus acid have been used in these reactions, but a little attention have been paid to silyl phosphonates. As a part of ongoing study on the structure and reactivity of organosilicon–phosphonate compounds, we synthesized bis(trimethylsilyl) (2–trimethylsilylethyl)phosphonate (I) by the reaction of bis(trimethylsilyl) phosphonate with vinyltrimethylsilane in the presence of a peroxide. The product was characterized by its ^1H and ^{31}P NMR and IR spectra. Hydrolysis of (I) led to the formation of corresponding phosphonic acid (II). The crystal structure of (II) has been determined by X-ray diffraction analysis.