Natarajan, B.; Gupta, S.; Ramamurthy, V.; Jayaraman, N., 2011, "Interfacial regions governing internal cavities of dendrimers. Studies of poly(alkyl aryl ether) dendrimers constituted with linkers of varying alkyl chain length", *J. Org. Chem*., *76*, 4018 – 4026.

This Article deals with a systematic study of the reaction cavity properties of a chosen dendrimer series. Interfacial regions of a dendritic structure are defined by the linkers that connect branch junctures at the interior, and this interfacial region further defines sizes and structures of dynamic inner cavities. In order to endow reaction cavity properties, the dendrimers were made soluble in water, so as to permit formation of hydrophobic inner cavities with which encapsulation of water insoluble guests could be accomplished. Synthesis of phloroglucinol-based poly(alkyl aryl ether) dendrimers of one to three generations, constituted with ethyl, n-propyl, n-butyl and n-pentyl linkers connecting the branch points were synthesized. Twelve dendrimers were thus prepared in order to evaluate how the interfacial regions governs the dynamic inner cavity properties. Upon synthesis, organic guest molecule encapsulations were studied involving four different dye molecules. From this study, the inner cavity property with respect to the linkers that constitute dendritic structures was adjudged. Important observation was that a lower generation dendrimer could function as a better host for hydrophobic guest molecules than a higher generation dendrimer, in conjunction with the nature of the linker. Subsequent to assessing the cavity properties, a Norrish I type photoreaction was conducted upon encapsulation of the substrate at the inner cavities of dendrimers in aqueous medium. From the photochemical studies, efficacies of the reaction cavities were analyzed as a function of the linkers that characterize the interface regions of a dendrimer. The study opens up dendrimers as host molecules to conduct organic reactions, in a manner analogous to many host molecules, such as, micelles, liposome, cyclodextrin and related cavitands, zeolites and polymers. Important criterion of how the interfacial regions influence the dynamic inner cavity properties is studied for the first time with dendrimers as the host molecules.