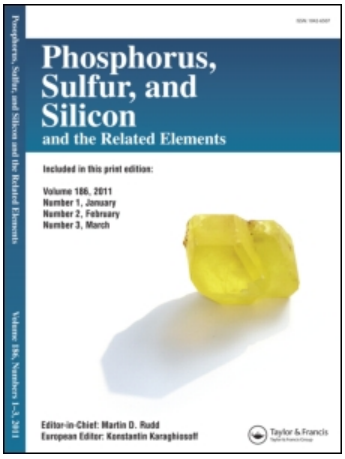

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Preparation, Identification and Application of Dendritic Carbosilanes

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Dendritic macromolecules using $((CH_2{=}CHCH_2)_{3-n}SiMe_nCH_2)_2$, $((CH_2{=}CHCH_2O)_{3-n}SiMe_nCH_2)_2(MeSi(CH{=}CH_2)O)_4$, $Me_nSi(C{\equiv}CPh)_{4-n}$ and $((PhC{\equiv}C)_{3-n}Me_nSiCH_2CH_2)_3C_6H_3$, hyperbranched carbosilane ($AB_2$and AB_3 type) and siloxane polymer as core and allyl, allyloxy, propagyloxy, and pheylethynyl groups as a building block have been described.

Keywords: Dendrimer; Carbosilane; Hydrosilation; Polysiloxane

The dendrimers containing allyloxysilyl and propagyloxysilyl-groups were prepared by the reaction of dichlorosilyl group containing dendrimers with allylalcohol or propagylol in the presence of TMED at room temperature. By the two alternatively repeating procedures (hydrosilation and alcoholysis), the dendrimers have been carried out up to the fourth generation with 64 propagyloxy groups on the periphery (Fig. 1). [1]

The dendritic macromolecule containing 144 phenylethynyl groups was created. The 1,3,5-tris(dimethylvinylsilyl)benzene (G0) as the core and bis(phenylethynyl)methylsilyl-groups as progressing units were used. The first generation (G1P-9Cl) was obtained by the reaction of G0 with trichlorosilane and followed to the phenylethynyl group containing generation (G1-9PA) by the reaction of lithium phenylacethylide. After that, by the use of the two iterative reaction mechanisms, the fifth generation with 144 phenylethynyl-group containing carbosilane dendrimer has been prepared (Fig. 2). [2] The dendritic macromolecule containing 144 phenylethynyl groups and related dendrimers followed to the gold metal containing dendrimers by the reaction of $AuCl_3$. The metal containing dendrimers revealed conducting properties at room temperature.

Double layered dendritic carbosilanes, containing phenylethynyl groups on the peripheral layer as well as propyleneoxy and ethenyloxy groups in the inner shell, have been prepared. The preparation of allyloxy group containing dendrimers was made by the reaction of chlorosilylated dendrimers with allylalcohol in the presence of TMED. The dendrimers with ethynyl groups on each terminal arm were obtained by the reaction of the chlorosilyl group containing generations with lithium phenylethynyl. Subsequently, by the iterative reactions such as hydrosilation and alkynylation as well as alcoholysis, dendritic macromolecules were generated to the fourth generation with 64 phenylethynyl groups on the peripheral layer. [3]

A synthetic method of the growth ring type dendritic macromolecules starting from siloxane polymer with Si-H bonds as core and dichlorovinylsilane, dichloromethylsilane, lithium phenylacethylide and allylmagnesium bromide as building block has been described. The dendritic polymers were produced to the second generation by the repetition of hydrosilation and alkenylation as well as alkynylation process.

The allyl and phenylethynyl group-containing polysiloxane dendrimers were characterized by the use of NMR, MALDI mass, elemental analysis as well as SEC. [4]

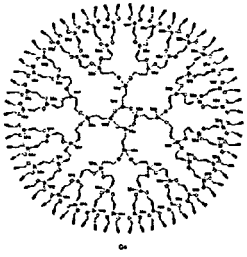

Fig. 1. Propagyloxy group based dendrimer

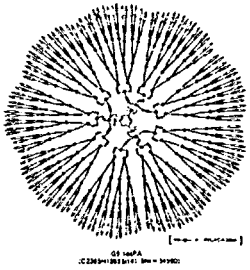

Fig. 2. Ethynyl group base dendrimer

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