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MOLECULAR RECOGNITION OF ORGANIC COMPOUNDS BY ORGANOPHOSPHOROUS DENDRIMERS VARIOUS GENERATIONS

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Dendrimers are well applicable for the elaboration of sensors, and as nanoparticle catalysts. Having tightly packed end groups, dendrimers of higher generations are selective to the size and shape of guest molecules with a preference to the smaller and less branched guests. In this respect, dendrimers are more selective than liquid or rubbery polymers, which do not have a special molecular recognition compared with ordinary liquid solvents.

In present work the receptor properties of organophosphorus dendrimers of the first (G_1), second (G_2), third (G_3), fourth (G_4) and ninth (G_9) generation with core >P(S)–, spacer unit *p*-(–O–C_6H_4–CH=N–N(CH_3)–), branch unit –P(S)< and terminal group *p*-(–O–C_6H_4–CHO) for vapors of organic compounds and water were studied using quartz crystal microbalance (QCM) sensors.

The phosphorus-containing dendrimers were found to have a specific nonlinear dependence of guest binding properties and thermal stability on their generation number, different size exclusion effects for different homological series of guests, a good balance between selectivity and reversibility in vapor sensor. An efficient guest exchange technique was elaborated for complete regeneration of the dendrimers in sensors after guest binding. The distinctions in the binding selectivity of the studied dendrimers are sufficient to construct a sensor array for molecular recognition of various organic vapors.

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