

Synthesis of bead type ion exchangers and adsorption properties of carbonyl compounds in cigarette mainstream smoke

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To use the filter materials for reduction of carbonyl compounds in cigarette mainstream smoke, the bead type cation and anion exchangers were synthesized by the suspension polymerization of glycidylmethacrylate (GMA) and divinylbenzene (DVB) followed by the subsequent functionalization with sodium sulfite and diethylamine, respectively. FT-IR/ATR was used to characterize functionalized copolymer formation by sulfonation and amination, and the morphology change of ion exchangers according to the adsorption of cigarette mainstream smoke were observed by SEM. And Ion exchange capacity, functionalization yield and adsorption properties of carbonyl compounds in cigarette mainstream smoke were investigated. The highest functionalization yields and ion exchange capacity were obtained at 5 wt% DVB content in co-monomer. The adsorption amount of carbonyl compounds was higher at using the anion exchanger compared to using the cation exchanger at dry conditions. The adsorption amount of carbonyl compounds in cigarette mainstream smoke of anion exchanger was higher than that of cation exchanger because of its electron delocalization in carbonyl group. The adsorption efficiency was increased under the exist of moisture. This results indicated that the anion exchanger was available to use cigarette filter material because of the large ion exchange capacity and rapid ion exchange reaction.