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## Retardation Effect of Sulfonic Acid on Thermal Radical Polymerization of Styrene

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A new polymerization retarder was investigated as an alternative to highly toxic dinitrophenols for the styrene distillation process. Dodecylbenzenesulfonic acid (DBS) was found to reduce the initial rate of thermal radical polymerization of styrene. The molecular weight of polystyrene resulting from thermal polymerization was slightly higher in the presence of DBS than in the absence of DBS. 1-Phenyltetraline (**1**), obviously produced by isomerization of the initial Diels-Alder adduct of styrene (**4**), was also detected in the presence of DBS. These observations suggest that DBS behaves as an acid catalyst for the isomerization of **4** to **1**. The retardation effect can be explained as the reduction of the concentration of initiate radicals generated from molecular assisted homolysis of **4** and monomeric styrene. Although only sulfonic acid cannot completely replace highly toxic and reactive dinitrophenols, it can reduce the amount of dinitrophenols required.

**Keywords:** [Dodecylbenzenesulfonic acid](#), [Polymerization retarder](#), [Polymerization inhibitor](#), [Thermal radical polymerization](#), [Styrene](#)

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