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Thermal Stabilities of Hydroxyalkyl Terminated Polydimethylsiloxane Oligomers

of

İskender YİLGOR, Emel YİLGOR

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 [Authors](#)

**Abstract:** The thermal stabilities of  $\alpha,\omega$ -hydroxypropyl,  $\alpha,\omega$ -hydroxybutyl  $\alpha,\omega$ -2-hydroxypentyl and  $\alpha,\omega$ -hydroxyhexyl terminated polydimethylsiloxane oligomers were investigated. Hydroxypropyl and hydroxybutyl terminated polydimethylsiloxane oligomers showed degradation upon heating through the loss of functional end groups, as determined by FTIR spectroscopy and gel permeation chromatography.  $\alpha,\omega$ -Hydroxyhexyl and  $\alpha,\omega$ -2-hydroxypentyl terminated polydimethylsiloxane oligomers were stable under similar conditions. The instability of the end groups is due to the backbiting of the terminal silicon in the PDMS by the primary hydroxyl oxygen, leading to the formation of 5- and 6-membered stable, heterocyclic compounds. Loss of end groups also resulted in a dramatic increase in the molecular weights of the oligomers produced, as determined by GPC.



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