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The linear rheological responses of dense branched brush polymers with different side chain lengths and structures MIAO HU, GREGORY MCKENNA, Department of Chemical Engineering, Texas Tech University, YAN XIA, CHRIS DAEFFLER, ANDREW BOYDSTON, ROBERT GRUBBS, JULIA KORNFIELD, Division of Chemistry and Chemical Engineering, California Institute of Technology — We examined the linear rheological responses of three kinds of dense and regular branched brush polymers. Brush polymers with different degree of polymerization were synthesized from the ω-Norbornenyl macromolecule (as main chain) with linear, three combined short arms, and dendronized brush structures. The master curves for these brush polymers were obtained by time temperature superposition (TTS) of the dynamic moduli from the glassy plateau region to the terminal flow region. The glassy modulus and rubbery modulus for these brush polymers were greatly influenced by the side chain properties. Two different relaxation processes can be observed for those samples with the higher molecular weight, slightly entangled, side chains. The dilution effect of the side chain which is related to the side chain volume fraction doesn't follows theoretical expectations.

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