

**TITLE** CURE AND SCORCH IN THE PROCESSING OF ETHYLENE-PROPYLENE-DIENE TERPOLYMER (EPDM)

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**ABSTRACT** The objective of this work is to ascertain the characteristics of desirable (cure) and especially undesirable (scorch) crosslinking when carbon black filled ethylene propylene diene terpolymer (EPDM) is processed using different peroxide initiators. The mixing temperature and the nature of the peroxide initiator are crucial parameters affecting scorch (undesirably premature crosslinking) in this rubber. Processability and properties of EPDM prepared using various mixer set temperatures have been investigated. Dicumyl peroxide (Luperox DC), di(t-butylperoxy) diisopropylbenzene (Luperox F), and 2,5-dimethyl-2,5-di(t-butylperoxy) hexane (Luperox 101) were used as crosslinking initiators. Higher mixing temperatures give shorter scorch times, greater scorch magnitudes, greater heterogeneities in crosslink spatial distribution and poorer tensile properties. However, extreme localization of the unwanted crosslinking at the rubber-filler interface does have a beneficial effect. Luperox DC offers poorer processability and poorer resulting properties than do Luperox F and Luperox 101, due to its shorter half-life and greater solubility in the rubber phase. This is the first time that the spatial heterogeneity of crosslinking and scorch has been related to the basic thermodynamics of 3-component 2-phase systems.