Supplementary materials

Coupling effect of molecular weight and crosslinking kinetics on the formation of rubber nanoparticles and their agglomerates in EPDM/PP TPVs during dynamic vulcanization

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Table S1 Characteristic properties of pure polymers

Polymers	Trade mark	Characteristic properties of pure polymers						
		Density (g/cm^3)	M_W (g·mol^{-1})	MFI (g·10min^{-1})	$ML_{(1+4)}$125 °C Pa^{-1}·s^{-1}	T_m (°C)	Ethylene content	ENB content
EPDM	3080L	1.02	~860,000	—	70	—	70%	3.5%
PP	HP500D	0.91	~623,300	0.5	—	170	—	—
PP	K1118	0.89	~271,900	7.8	—	160	—	—

*At 230 °C and 2.16 kg; M_W: Molecular weight; MFI: Melt flow index; ML: Mooney viscosity; T_m: Melt temperature; ENB: 5-ethylidene-2-norbornene.

Table S2 Formulas of neat EPDM with various crosslinking systems for static curing characteristic.

Components	E/C$_1$/AC$_1$-1 (H$_{CR}$L$_{CD}$)	E/C$_1$/AC$_1$-2 (H$_{CR}$M$_{CD}$)	E/C$_2$/AC$_2$ (L$_{CR}$H$_{CD}$)
EPDM (g)	60	60	60
Phenolic resin (g)	—	—	1.12
$SnCl_2$ (g)	—	—	0.2
TBPA (g)	0.62	1.86	—
TMPTMA (g)	0.27	0.81	—

Table S3 Different codes of the five selected samples for each blend system during DV

Blends	**Codes of the five selected samples during DV**				
PH-$L_{CR}H_{CD}$	A_1^H	B_1^H	C_1^H	D_1^H	E_1^H
PL-$L_{CR}H_{CD}$	A_1^L	B_1^L	C_1^L	D_1^L	E_1^L
PH-$H_{CR}M_{CD}$	A_2^H	B_2^H	C_2^H	D_2^H	E_2^H
PL-$H_{CR}M_{CD}$	A_2^L	B_2^L	C_2^L	D_2^L	E_2^L
PH-$H_{CR}L_{CD}$	A_3^H	B_3^H	C_3^H	D_3^H	E_3^H
PL-$H_{CR}L_{CD}$	A_3^L	B_3^L	C_3^L	D_3^L	E_3^L

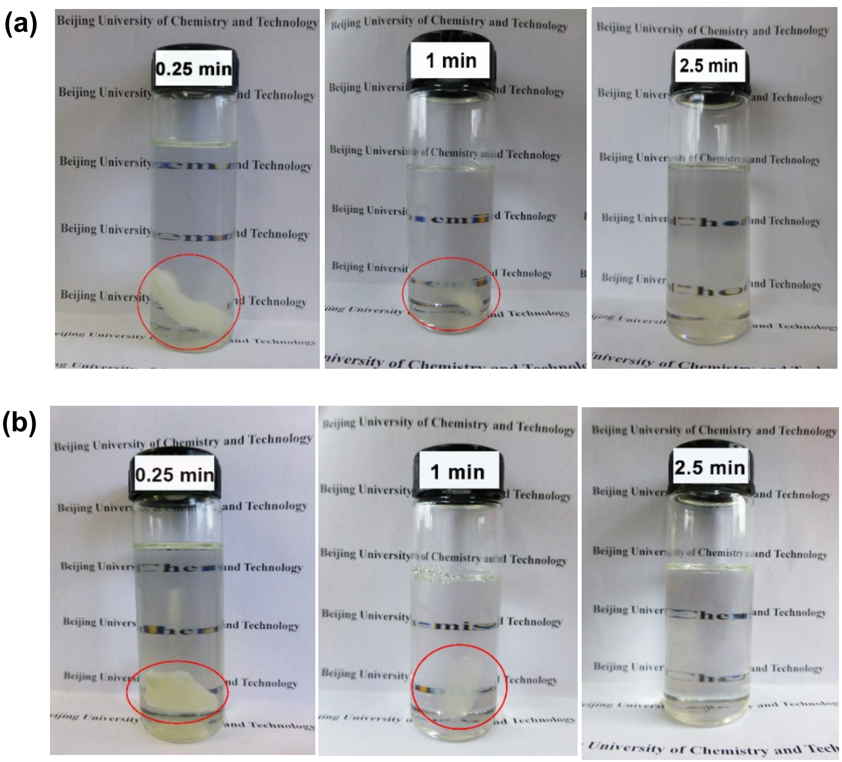

Fig. S1 Photographs of disintegration test of different EPDM/PP (60/40) blends obtained at various DV times in hot xylene at 120 °C: (a) PH-$H_{CR}L_{CD}$; (b) PL-$H_{CR}L_{CD}$.

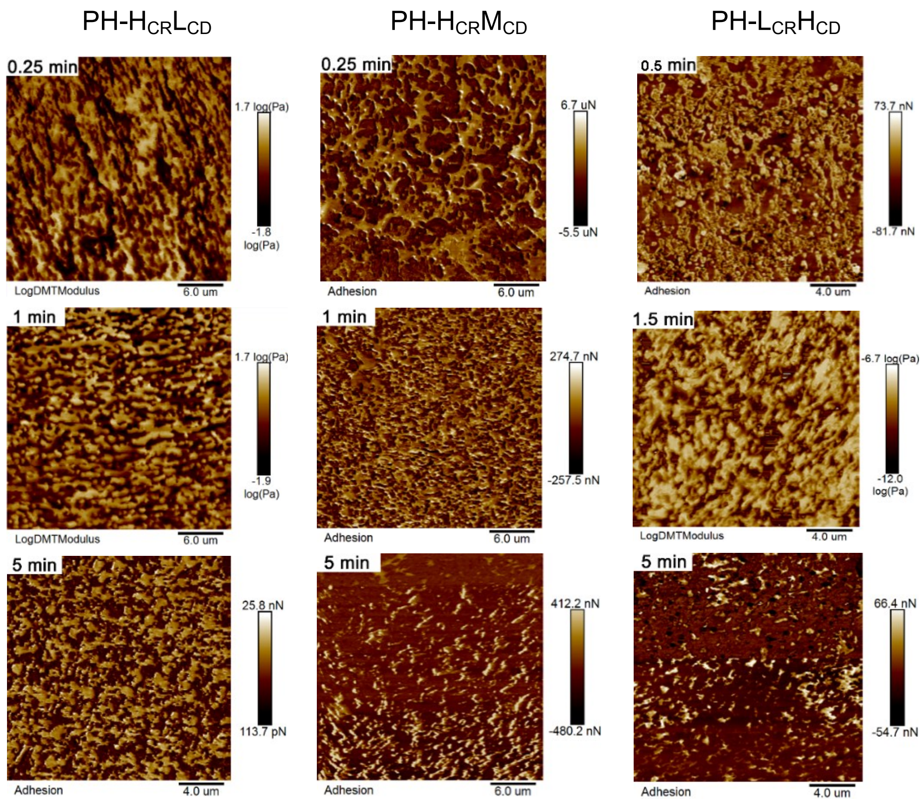

Fig. S2 AFM images of EPDM/PH blends prepared at different crosslinking conditions under various DV times. (The darker regions represent PP phase, and the lighter regions represent EPDM rubber phases)

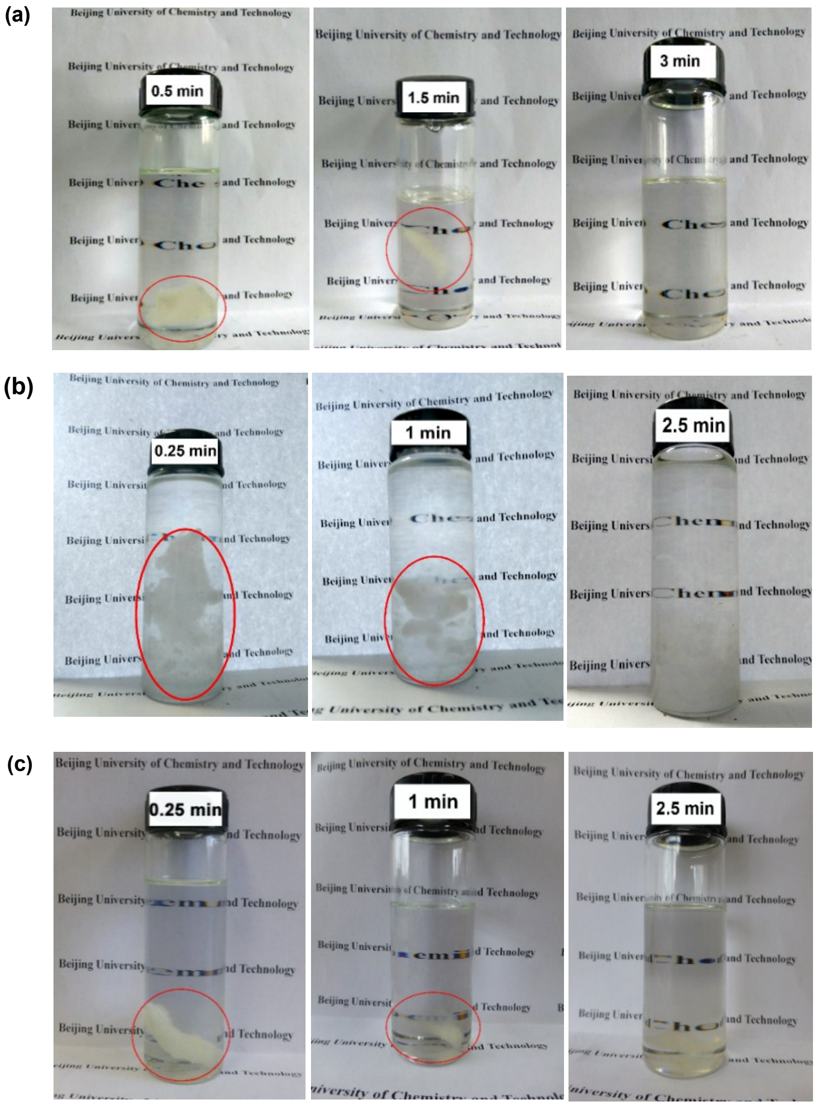

Fig. S3 Photographs of disintegration test of different EPDM/PP (60/40) blends obtained at various DV times in hot xylene at 120 °C: (a) PH-$L_{CR}H_{CD}$; (b) PH-$H_{CR}M_{CD}$; (c) PH-$H_{CR}L_{CD}$.