

Supporting Information

Effect of fatty acids on the accelerated sulfur vulcanization of rubber by active zinc/carboxylate complexes

Preeyanuch Junkong,^{a,b} Rie Morimoto,^c Kosuke Miyaji,^{a,c} Atitaya Tohsan,^{a,d}
Yuta Sakaki,^{a,c} Yuko Ikeda,^{*a,e}

*^aCenter for Rubber Science and Technology, Kyoto Institute of Technology, Matsugasaki,
Sakyo, Kyoto 606-8585, Japan.*

^bFaculty of Science, Mahidol University, Ratchathewi, Bangkok 10400, Thailand.

*^cGraduate School of Science and Technology, Kyoto Institute of Technology, Matsugasaki,
Sakyo, Kyoto 606-8585, Japan.*

*^dFaculty of Engineering, King Mongkut's University of Technology North Bangkok, 1518
Pracharat 1 Rd, Wongsawang, Bangsue, Bangkok 10800, Thailand.*

*^eFaculty of Molecular Chemistry and Engineering, Kyoto Institute of Technology, Matsugasaki,
Sakyo, Kyoto 606-8585, Japan.*

*Corresponding author

E-mail: yuko@kit.ac.jp.

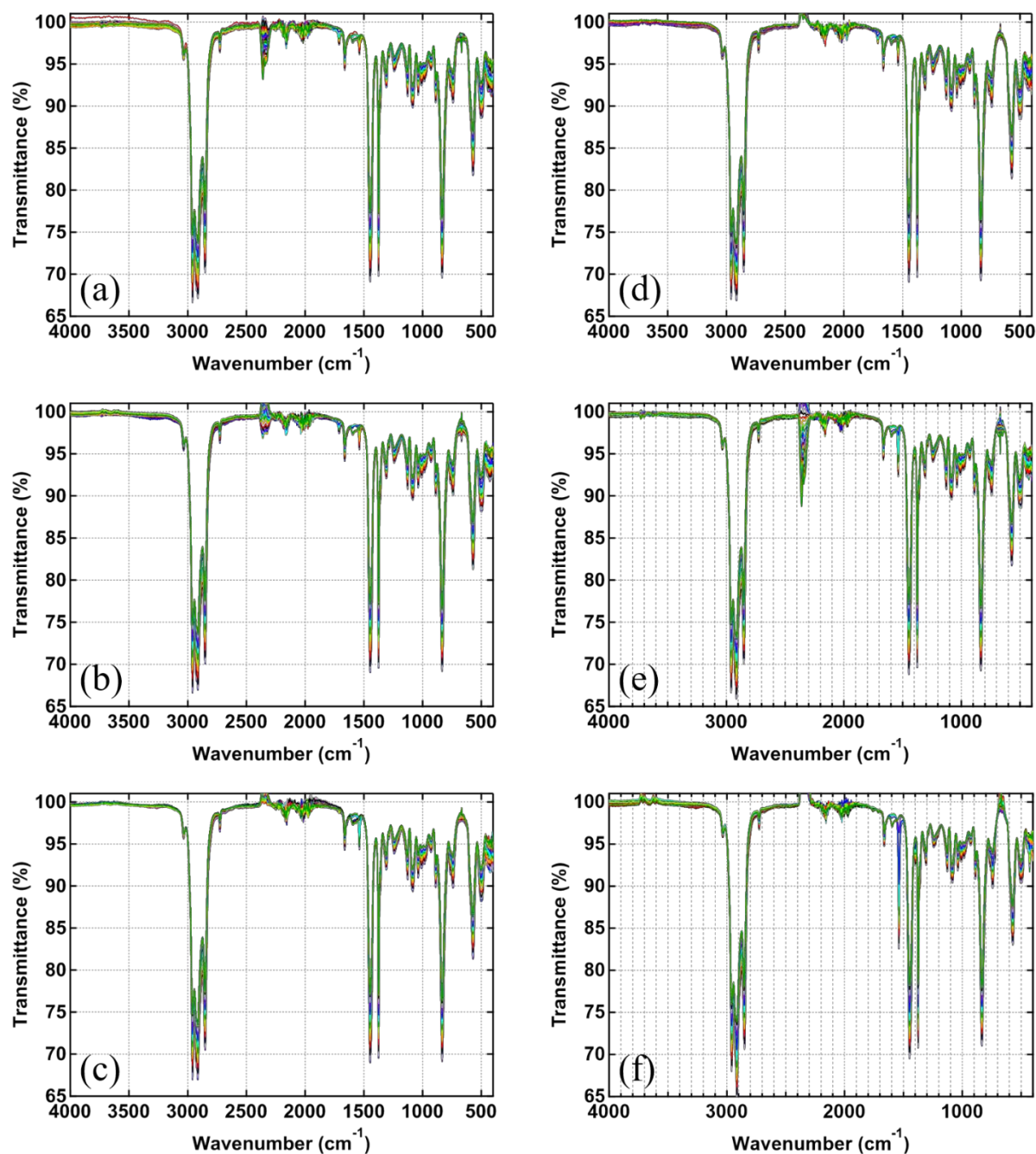


Figure S1 FT-IR spectra of the heating process from 35 to 144 °C and the constant temperature condition at 144 °C for (a) IR-ZnO(0.5)-LaH(1.4), (b) IR-ZnO(0.5)-MyH(1.6), (c) IR-ZnO(0.5)-PaH(1.8), (d) IR-ZnO(0.5)-StH(2.0), (e) IR-ZnO(0.5)-ArH(2.2), and (f) IR-ZnSt2(4.5) in the range of 4000–400 cm^{-1} .

Table S1 Identification of the FT-IR bands shown in Figure S1

Wavenumber (cm ⁻¹)	Functional group	Type of vibration
3030	C-H (cis alkenes, aromatic)	antisymmetric stretching
2960, 2910	C-H (methyl groups)	antisymmetric,symmetric stretching
2920, 2855	C-H (methylene groups)	antisymmetric,symmetric stretching
1760	C=O (carboxylic acid monomers)	antisymmetric stretching
1715	C=O (carboxylic acid dimers)	antisymmetric stretching
1660	C=C (alkenes)	symmetric stretching
1600-1560	COO ⁻ (metal carboxylate)	antisymmetric stretching
1540	C=O (metal carboxylate)	stretching
1450	C-H (methylene groups)	scissor bending
1430	COO ⁻ (metal carboxylate)	symmetric stretching
1375	C-H (methyl groups)	rock bending
833	C-H (alkenes)	out of plane bending

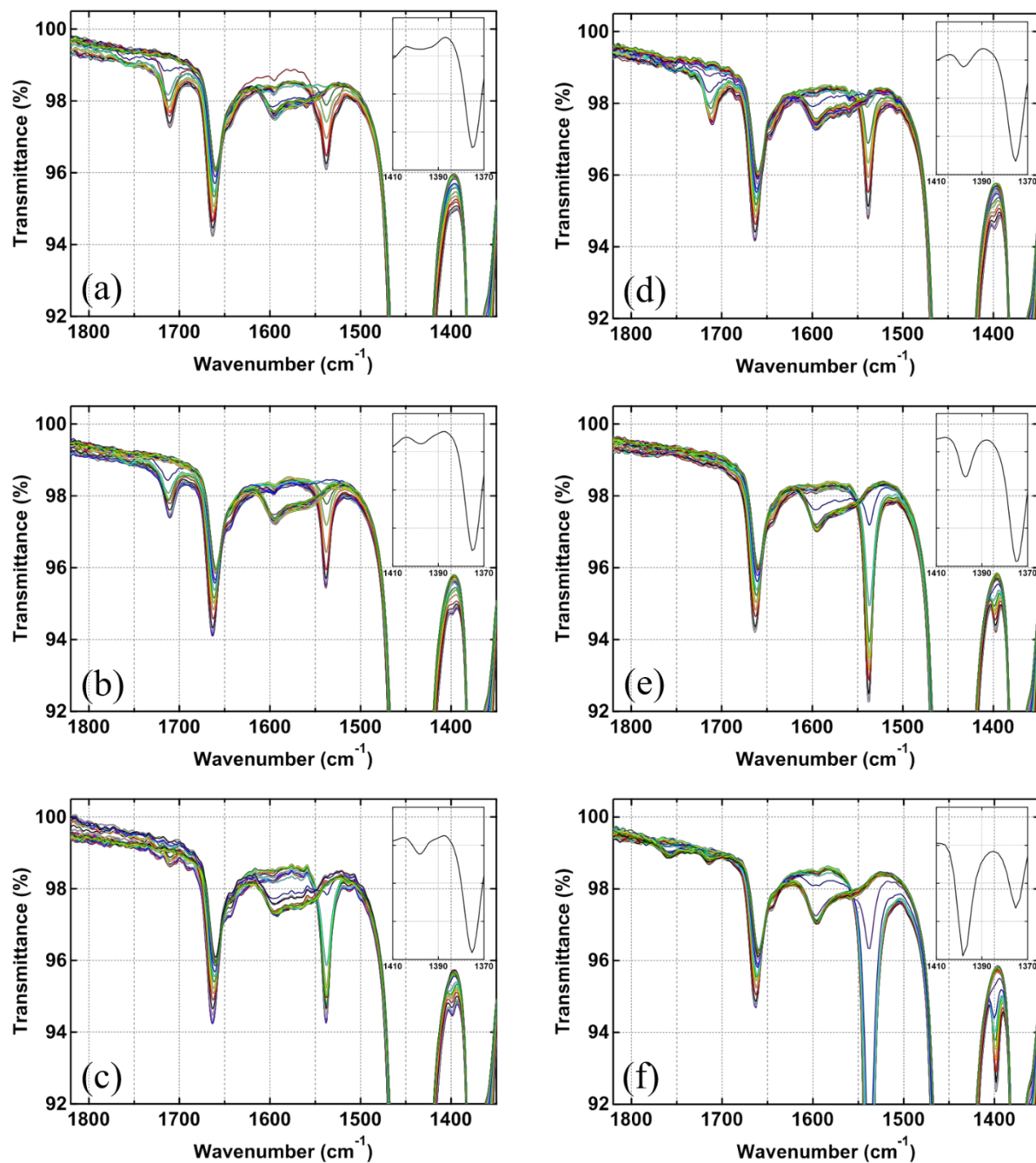


Figure S2 FT-IR spectra of the heating process from 35 to 144 °C and the constant temperature condition at 144 °C for (a) IR-ZnO(0.5)-LaH(1.4), (b) IR-ZnO(0.5)-MyH(1.6), (c) IR-ZnO(0.5)-PaH(1.8), (d) IR-ZnO(0.5)-StH(2.0) and (e) IR-ZnO(0.5)-ArH(2.2) in the range of 1820–1350 cm^{-1} . The inset shows the differential FT-IR spectrum of the samples subtracted by raw isoprene rubber spectrum at 35 °C in the range of 1410–1370 cm^{-1} .