Supporting Information

FOR

Environmentally Friendly Phosphonated Polyetheramine Scale Inhibitors - Excellent Calcium Compatibility for Oilfield Applications

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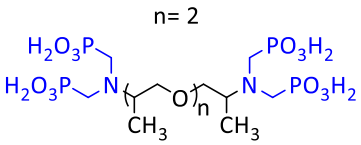
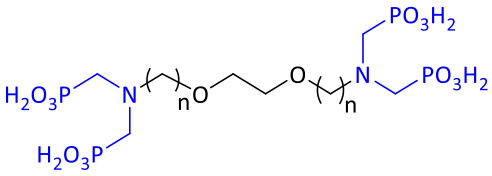
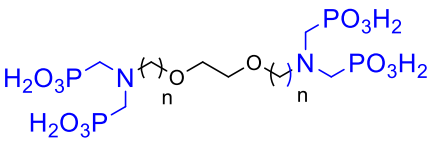
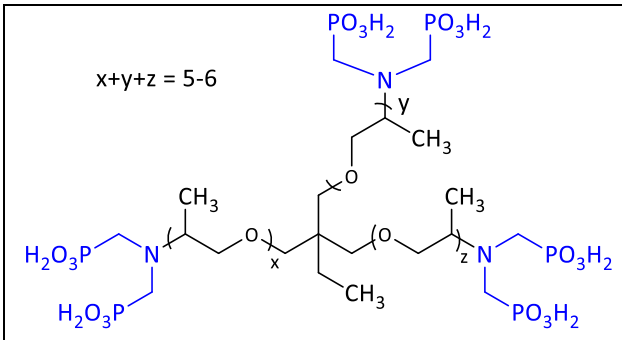
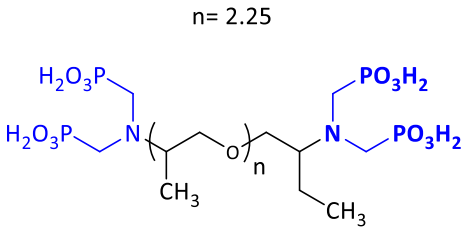
Table S1. Chemical structure and spectra data of phosphonated polyetheramines SIs.

Compound	Spectral data
 **SI-1**	*Phosphonated Polyetheramine (**SI-1, pH = 4**):* ^{1}H NMR (D_2O, 400 MHz) δ ppm: 0.95-1.10 (d, br, 3H X 3, C**H**$_3$), 3.12-4.10 (m, br, 2H X 4, C**H**$_2$-PO_3H_2 + 2H X 3, OC**H**$_2$ + 1H X 3, C**H**CH_3); ^{31}P NMR (D_2O, 162.00 MHz) δ 22.00 ppm.
 **SI-2**	*Phosphonated Polyetheramine (**SI-2, pH = 4**):* ^{1}H NMR (D_2O, 400 MHz) δ ppm: 1.97 (t, 2H X 2, OC**H**$_2$C**H**$_2$), 3.47-3.57 (m, br, 4H X 2, OC**H**$_2$N +2H X 4, C**H**$_2$-PO_3H_2); ^{31}P NMR (D_2O, 162.00 MHz) δ 22.60 ppm.
 **SI-3**	*Phosphonated Polyetheramine (**SI-3, pH = 4**):* ^{1}H NMR (D_2O, 400 MHz) δ ppm: 1.95 (t, 2H X 2, OC**H**$_2$C**H**$_2$), 3.45-3.58 (m, br, 6H X 2, OC**H**$_2$C**H**$_2$C**H**$_2$N+ 2H X 4, C**H**$_2$-PO_3H_2); ^{31}P NMR (D_2O, 162.00 MHz) δ 22.62 ppm.
	*Phosphonated Polyetheramine (**SI-4, pH = 4**):* ^{1}H NMR (D_2O, 400 MHz) δ ppm: 0.72 (t, br, 3H X 1, C**H**$_3$), 1.01-1.32 (m, br, 2H X 1,C**H**$_2$CH$_3$, + 3H X 5-6, CHC**H**$_3$), 3.32-

 **SI-4**	4.13 (m, br, 2H X 5-6, CC**H**$_2$O + 2H X 5-6, OC**H**$_2$CHCH$_3$ + 1H X 5-6, C**H**CH$_3$ + 2H X 6, C**H**$_2$-PO$_3$H$_2$); ^{31}P NMR (D$_2$O, 162.00 MHz) δ 22.65 ppm
 **SI-5**	*Phosphonated Polyetheramine (**SI-5, pH = 4**):* ^{1}H NMR (D$_2$O, 400 MHz) δ ppm: 0.91 (t, br, 3H X 1, CH$_2$C**H**$_3$), 1.46-1.81 (m, br, 2H X 1, C**H**$_2$CH$_3$ + 3H X 2.25, OCH$_2$CHC**H**$_3$), 3.23-4.00 (m, br, 1H X 2.25, OCH$_2$C**H**CH$_3$ + 2H X 2.25, OC**H**$_2$CHCH$_3$ + 2H X 1, OC**H**$_2$CH(CH$_2$CH$_3$)N + 1H X 1, OCH$_2$C**H**(CH$_2$CH$_3$)N + 2H X 4, C**H**$_2$-PO$_3$H$_2$); ^{31}P NMR (D$_2$O, 162.00 MHz) δ 22.34 ppm

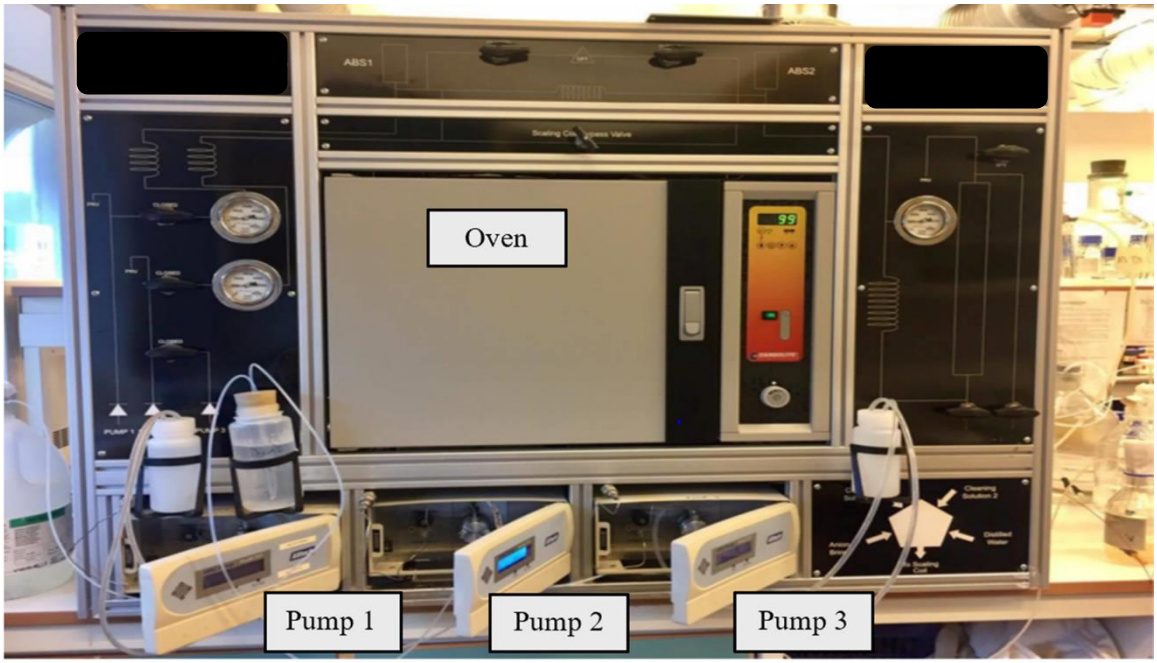



Figure S1. The scale Rig used for high-pressure tube blocking testing of SIs.