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Supporting Information

Organolanthanide-Catalyzed Synthesis of Phosphine-Terminated Polyethylenes. Scope and Mechanism.

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Figure S-1. ^{31}P NMR spectral monitoring of the oxidation of diphenylphosphine-capped polyethylene (**a**) to diphenylphosphine oxide-capped polyethylene (**b**).

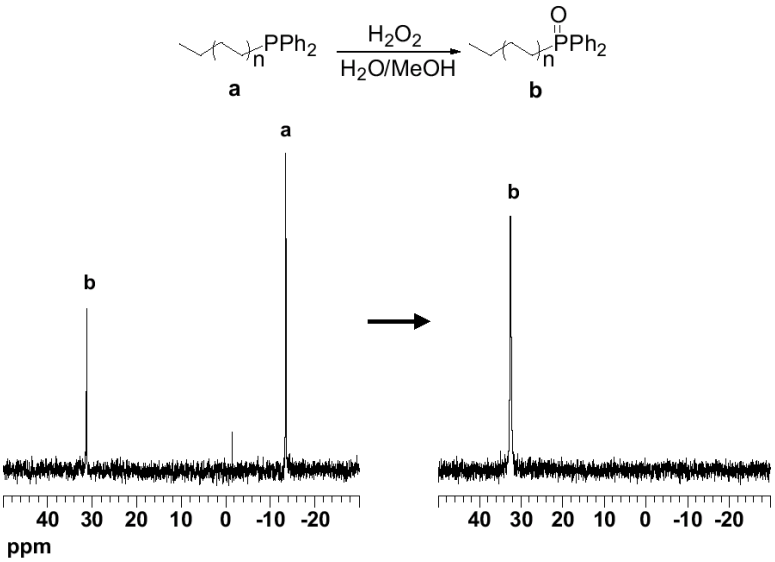

Figure S-2. ^{1}H NMR spectrum (400 MHz, $C_2D_2Cl_4$) of diethylphosphine oxide-terminated polyethylene synthesized by an in situ generated Cp'_2LaPEt_2 polymerization catalyst.

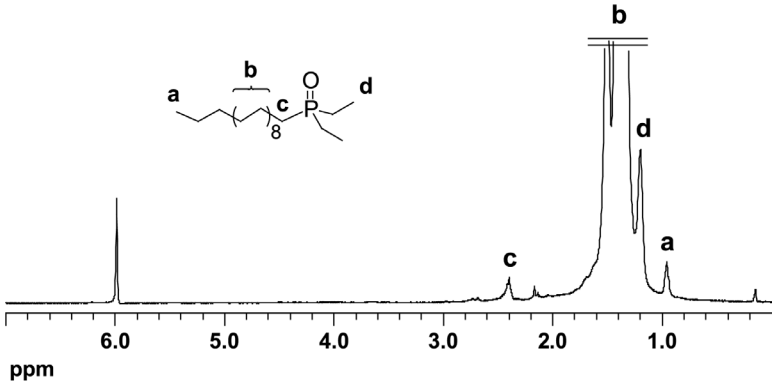

Figure S-3. ^{1}H NMR spectrum (400 MHz, $C_2D_2Cl_4$) of di-*iso*-butylphosphine oxide-terminated polyethylene synthesized by an in situ generated $Cp'_2LaP^iBu_2$ polymerization catalyst.