Mechanisms of Hydrogen, Oxygen, and Electron Transfer Reactions of Cumylperoxyl Radical

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Figure S1. Plots of $k_{\text{obs}}$ vs concentrations of $N,N$-dimethylanilines for hydrogen transfer from $N,N$-dimethylanilines to PhCMe$_2$OO$^\cdot$ in O$_2$-saturated EtCN at 193 K. (a) Me-DMA, (b) Me-DMA-(CD$_3$)$_2$, (c) MeO-DMA, (d) MeO-DMA-(CD$_3$)$_2$, and (e) Br-DMA.
Figure S2. Plots of log $k_1$ and log $k_2$ vs $\Delta \Delta H_f$ obtained by DFT calculations for hydrogen transfer from DMAs to PhCMe$_2$OO$^\cdot$ in O$_2$-saturated EtCN and pentane at 193 K. The $\Delta \Delta H_f$ value of DMA is taken as zero.
Figure S3. Plots of $k_{\text{obs}}$ vs concentrations of triphenylphosphine derivatives for oxygen transfer from PhCMe$_2$OO$^\cdot$ to triphenylphosphine derivatives in O$_2$-saturated EtCN at 193 K. (a) Ph$_3$P, (b) ($p$-MeC$_6$H$_4$)$_3$P, (c) ($p$-MeOC$_6$H$_4$)$_3$P, (d) ($p$-MeC$_6$H$_4$)(Ph)$_2$P, (e) ($p$-ClC$_6$H$_4$)$_3$P, and (f) ($p$-FC$_6$H$_4$)$_3$P.
Figure S4. Plots of $k_{\text{obs}}$ vs concentrations of triphenylphosphine derivatives for oxygen transfer from PhCMe$_2$OO$^*$ to triphenylphosphine derivatives in O$_2$-saturated pentane at 193 K. (a) Ph$_3$P, (b) (p-MeC$_6$H$_4$)$_3$P, (c) (p-MeC$_6$H$_4$)(Ph)$_2$P, and (d) (p-FC$_6$H$_4$)$_3$P.
Figure S5. Plots of $k_{\text{obs}}$ vs concentrations of thioanisoles for oxygen transfer from PhCMe$_2$OO$^\cdot$ to thioanisoles in O$_2$-saturated pentane at 193 K. (a) TA, (b) Me-TA, (c) MeO-TA, and (d) Cl-TA.
Figure S6. Plots of $k_{obs}$ vs concentrations of ferrocene derivatives for electron transfer from ferrocene derivatives to PhCMe$_2$OO$^\cdot$ in O$_2$-saturated EtCN at 193 K. (a) Fe(C$_5$H$_5$)$_2$, (b) Fe(C$_5$H$_5$)(C$_5$H$_4$Bu$^\alpha$), (c) Fe(C$_5$H$_4$Bu$^\alpha$)$_2$, and (d) Fe(C$_5$Me$_5$)$_2$. 
Figure S7. Plot of $k_{\text{obs}}$ vs $[\text{Mg}^{2+}]$ for electron transfer from Fe($C_5H_5)_2$ (2.0 x 10^{-3} M) to PhCMe$_2$OO$^\bullet$ in the presence of Mg$^{2+}$ in O$_2$-saturated EtCN at 193 K.
Figure S8. Plots of $g$ value of cumylperoxyl radical vs concentrations of DMA and TA in pentane at 193 K.