Thermoresponsive Polymer Supporter for Concerted Catalysis of Ferrocene with Ruthenium Catalyst in Living Radical Polymerization: High Activity and Efficient Removal of Metal Residues

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Figure S1. $^1$H NMR spectrum of PPh$_3$–Fc–PEG in CD$_2$Cl$_2$ at room temperature.

Figure S2. (A) $^1$H (in CD$_2$Cl$_2$), and (B) $^{31}$P NMR (in CDCl$_3$) spectrum of PPh$_3$–PEG at room temperature.
Figure S3. $^1$H NMR spectrum of Fc–PEG in CD$_2$Cl$_2$ at room temperature.

Figure S4. Solubility of Ru(Cp*)Cl(PPh$_3$)$_2$ (A) and FeCp$_2$ (B) in a toluene/water biphasic solution: [Ru(Cp*)Cl(PPh$_3$)$_2$]$_0$ = 1.0 mM; [FeCp$_2$]$_0$ = 40 mM.
Figure S5. Removal of Ru–Fc–PEG polymer catalyst from obtained PMMA by washing with water: SEC curves of PPh₃–Fc–PEG (A), the solution of Ru–Fc–PEG catalyzed polymerization of MMA for 9h (see Figure 4A, entry 2 in the main text; B), and the obtained PMMA after washing with water (C).
Removability of Ru ($\text{Ru}_{\text{remov}}$) = \[ 1 - \frac{\text{Residual Ru from ICP–AES}}{\text{Weight of the initially added Ru in 1g of PMMA} \times \text{Conv.}} \]

Removability of Fe ($\text{Fe}_{\text{remov}}$) = \[ 1 - \frac{\text{Residual Fe from ICP–AES}}{\text{Weight of the initially added Fe in 1g of PMMA} \times \text{Conv.}} \]

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\begin{align*}
\text{Ru}_{\text{init}} & = \frac{(\text{Atomic weight of the Ru, g/mol}) \times (\text{Ru feed on polymerization, mM})}{(\text{Molecular weight of MMA, g/mol}) \times (\text{MMA feed on polymerization, mM}) \times \text{Conv.}} \\
\text{Fe}_{\text{init}} & = \frac{(\text{Atomic weight of the Fe, g/mol}) \times (\text{Fe feed on polymerization, mM})}{(\text{Molecular weight of MMA, g/mol}) \times (\text{MMA feed on polymerization, mM}) \times \text{Conv.}}
\end{align*}
\]

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\begin{align*}
\text{Ru}_{\text{remov}} & = 1 - \frac{5.7 \times 10^{-6}}{2.72 \times 10^{-3}} = 0.998 (99.8\%) \\
\text{Fe}_{\text{remov}} & = 1 - \frac{89 \times 10^{-6}}{6.06 \times 10^{-3}} = 0.985 (98.5\%)
\end{align*}
\]

**Figure S6.** The calculation methods for the removability of Ru ($\text{Ru}_{\text{remov}}$) and Fe ($\text{Fe}_{\text{remov}}$) in PMMA after washing with water (see Figure 5 in the main text).