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THE EFFECT OF THE CATALYST AND THE TYPE OF IONIC LIQUID ON THE HYDROSILYLATION PROCESS UNDER BATCH AND CONTINUOUS REACTION CONDITIONS

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Hydrosilylation reaction in batch with using different IL/catalyst system - yields

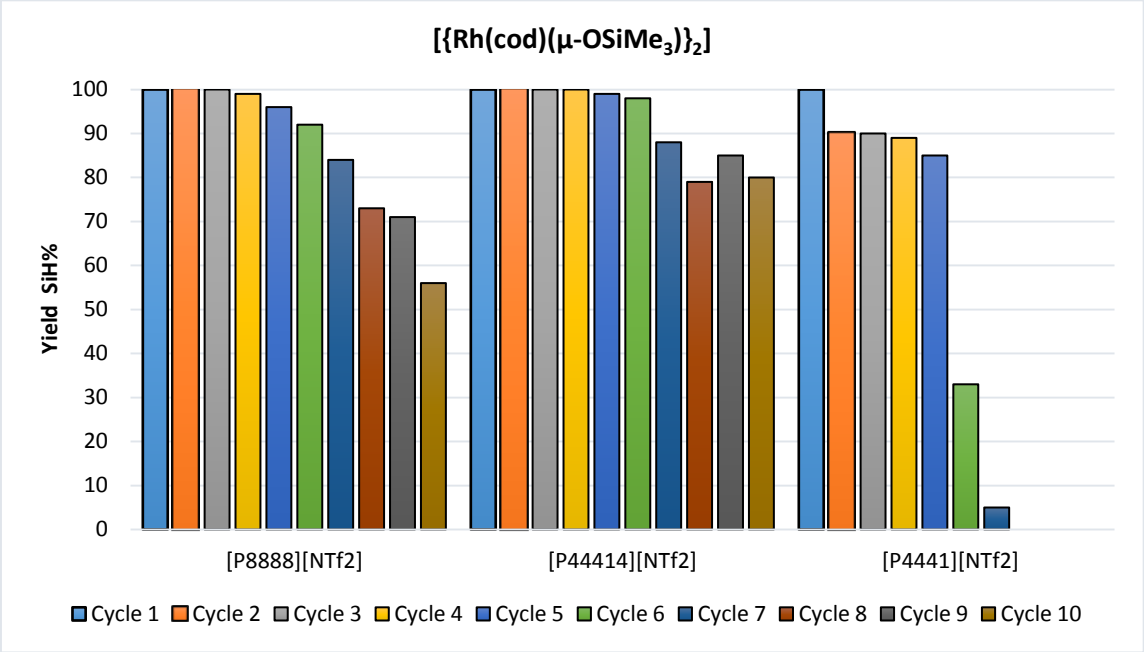


Figure S1. Yield of hydrosilylation reaction using $[Rh(cod)(\mu\text{-}OSiMe_3)]_2$ as catalyst in $[P_{8888}][NTf_2]$, $[P_{44414}][NTf_2]$ and $[P_{4441}][NTf_2]$

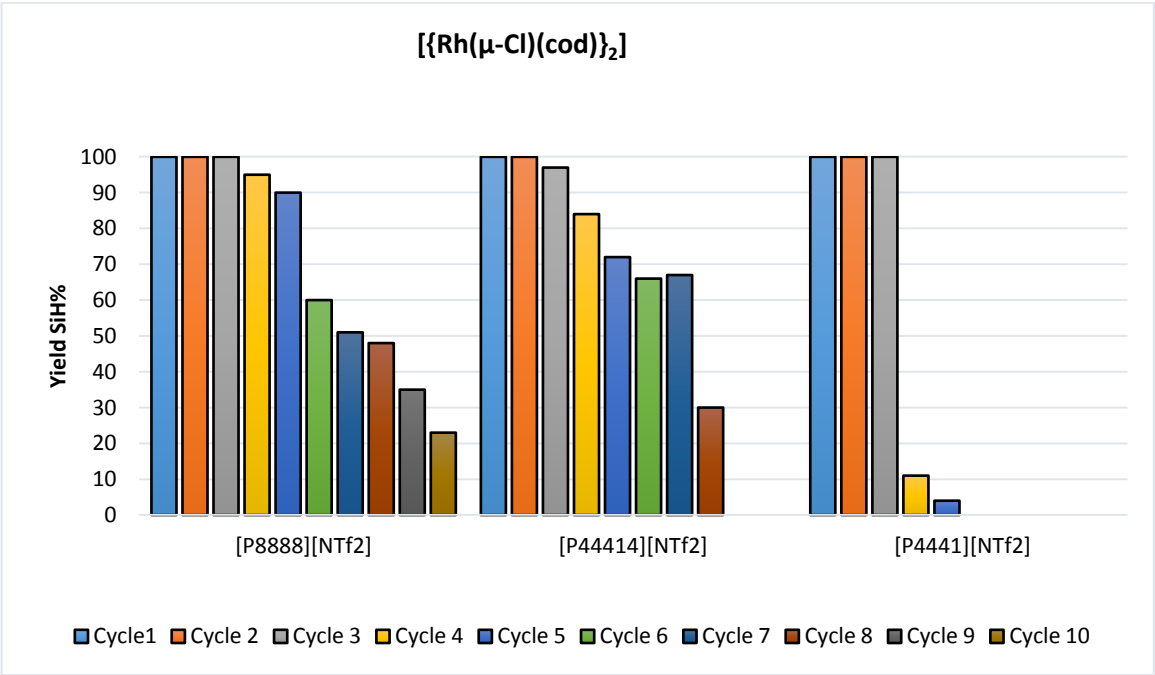


Figure S2. Yield of hydrosilylation reaction using $[Rh(\mu\text{-}Cl)(cod)]_2$ as catalyst in $[P_{8888}][NTf_2]$, $[P_{44414}][NTf_2]$ and $[P_{4441}][NTf_2]$

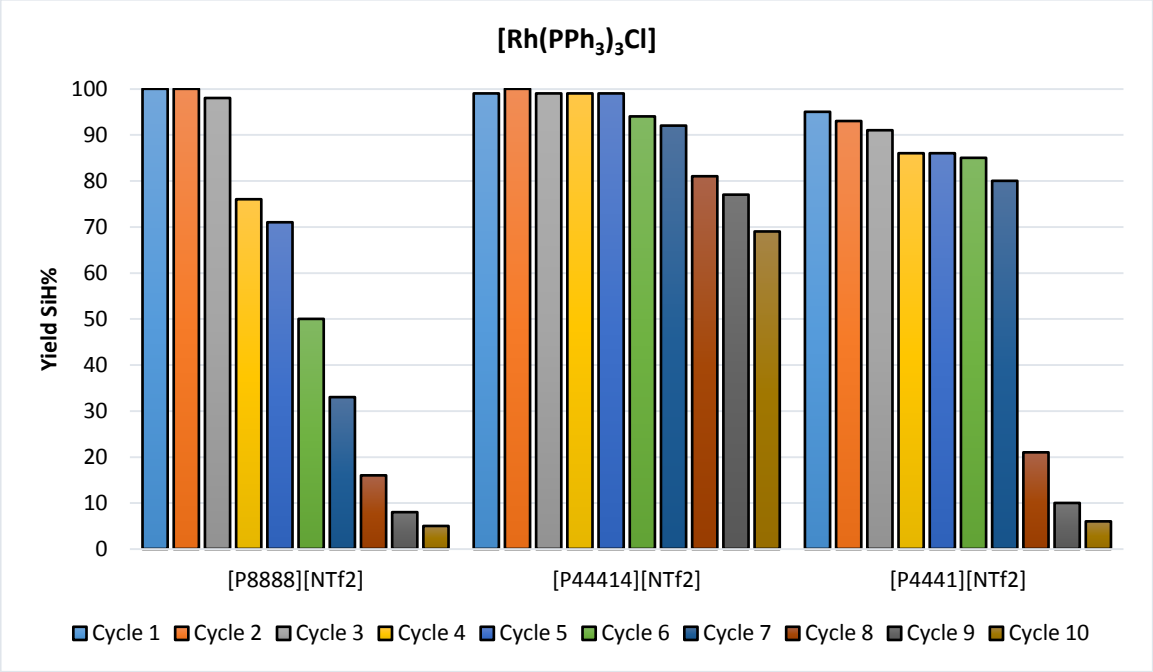


Figure S3. Yield of hydrosilylation reaction using $[Rh(PPh_3)_3Cl]$ as catalyst in $[P_{8888}][NTf_2]$, $[P_{44414}][NTf_2]$ and $[P_{4441}][NTf_2]$

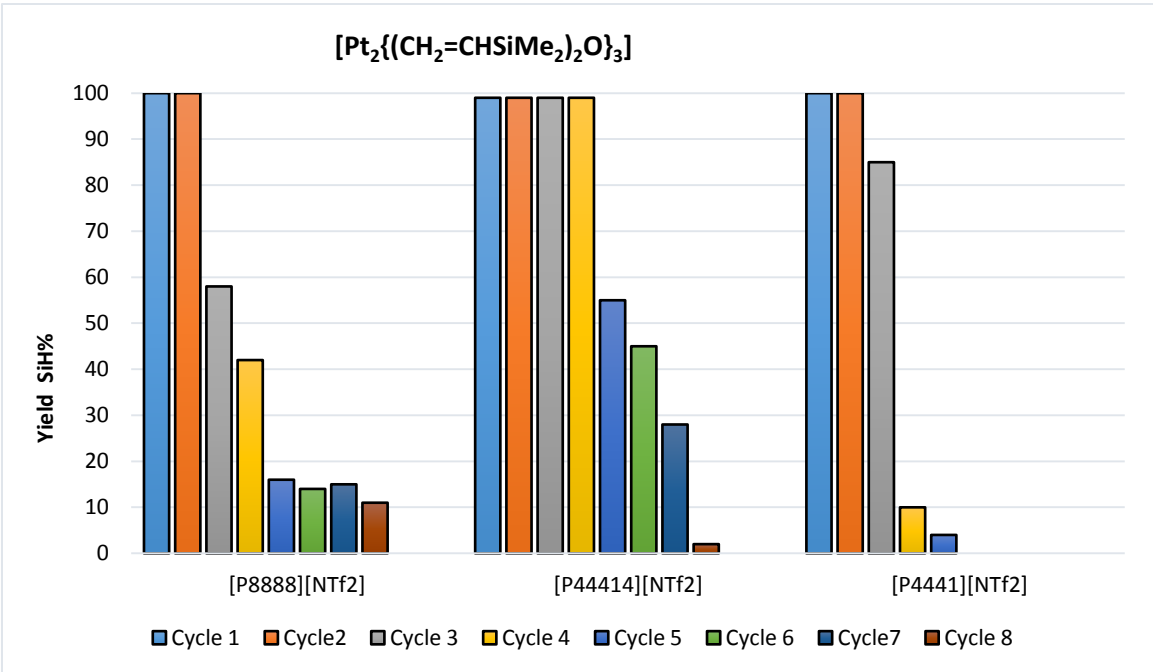


Figure S4. Yield of hydrosilylation reaction using $[Pt_2\{(CH_2=CHSiMe_2)_2O\}_3]$ as catalyst in $[P_{8888}][NTf_2]$, $[P_{44414}][NTf_2]$ and $[P_{4441}][NTf_2]$

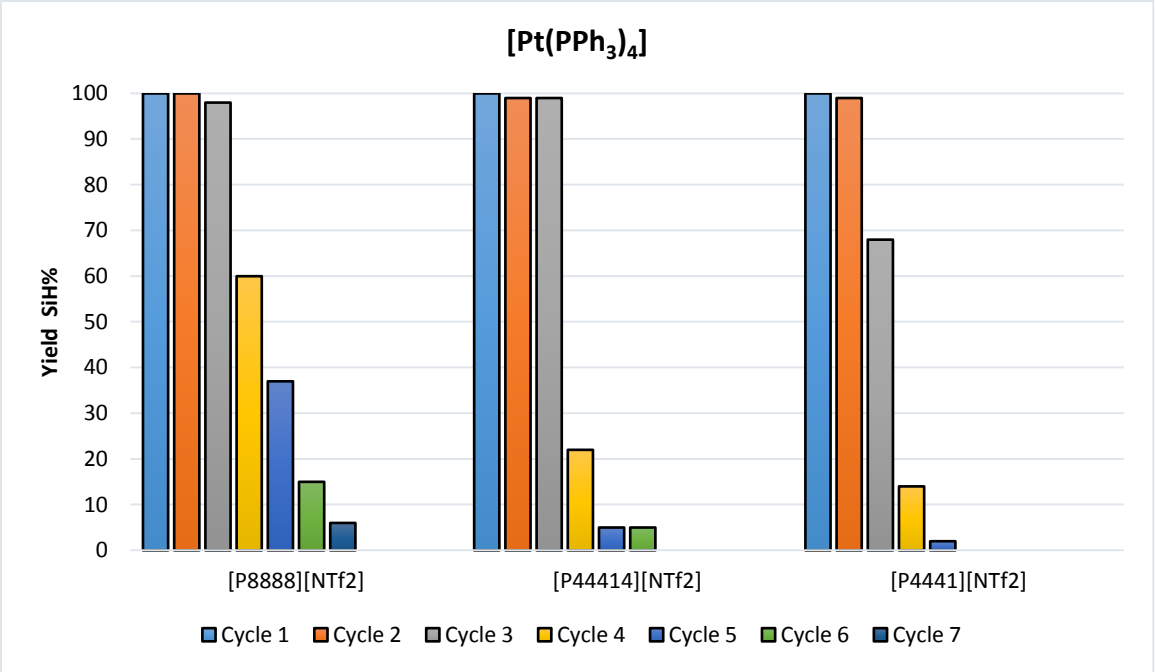


Figure S5. Yield of hydrosilylation reaction using $[Pt(PPh_3)_4]$ as catalyst in $[P_{8888}][NTf_2]$, $[P_{44414}][NTf_2]$ and $[P_{4441}][NTf_2]$

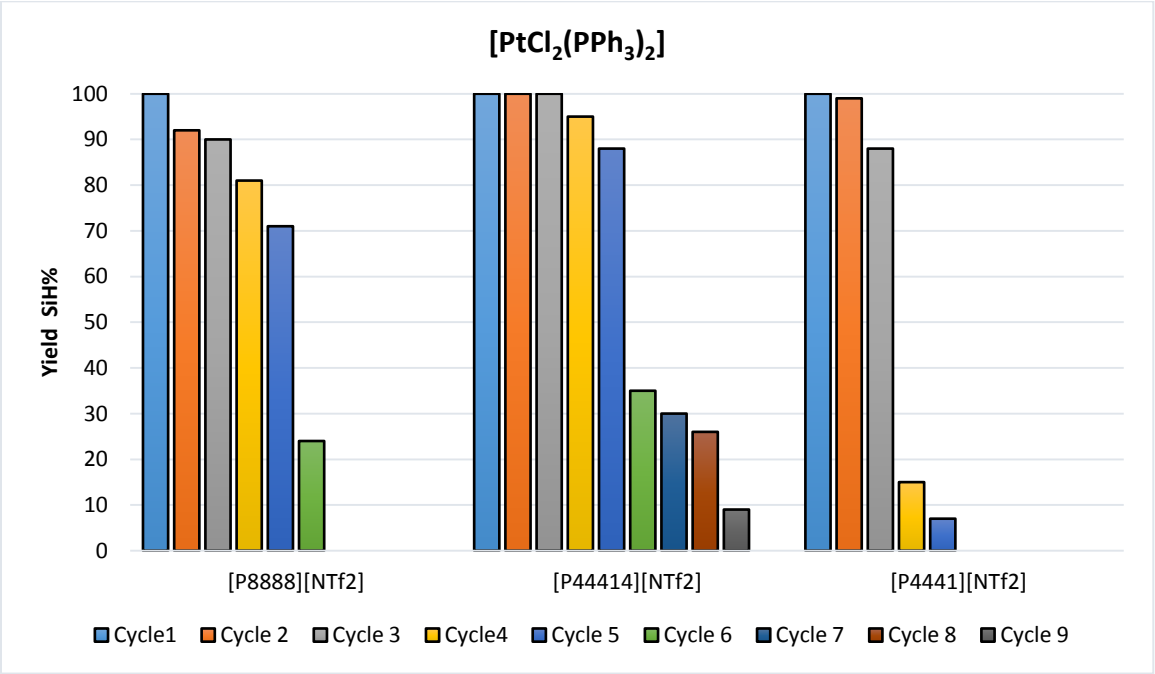


Figure S6. Yield of hydrosilylation reaction using $[PtCl_2(PPh_3)_2]$ as catalyst in $[P_{8888}][NTf_2]$, $[P_{44414}][NTf_2]$ and $[P_{4441}][NTf_2]$

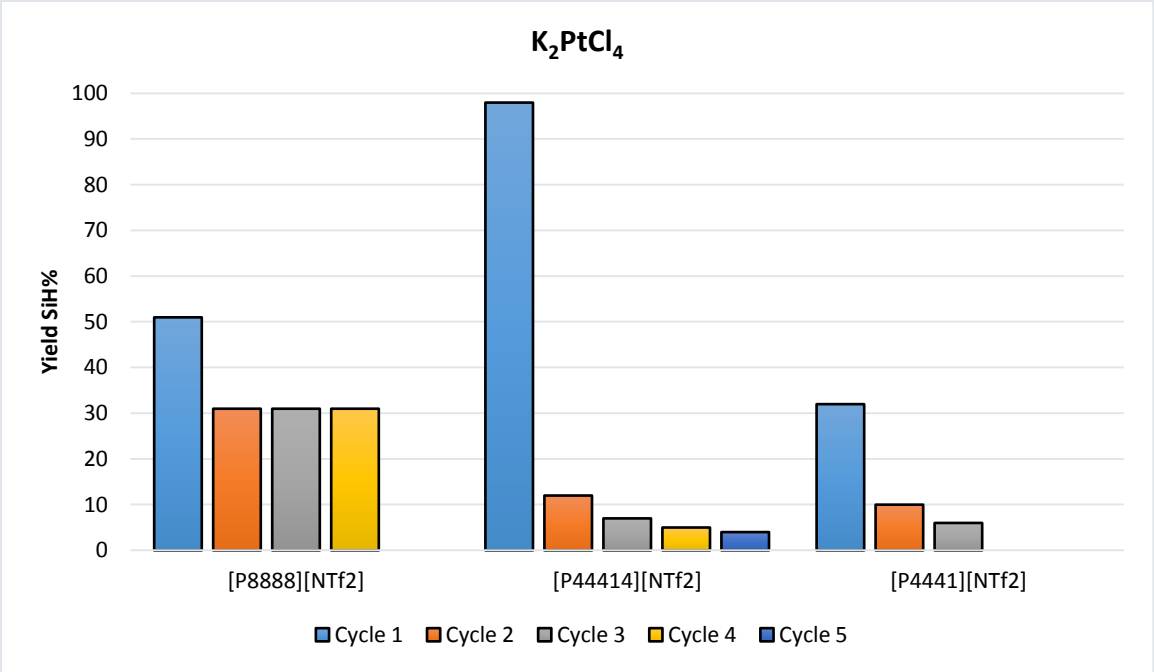


Figure S7. Yield of hydrosilylation reaction using K_2PtCl_4 as catalyst in $[P_{8888}][NTf_2]$, $[P_{44414}][NTf_2]$ and $[P_{4441}][NTf_2]$

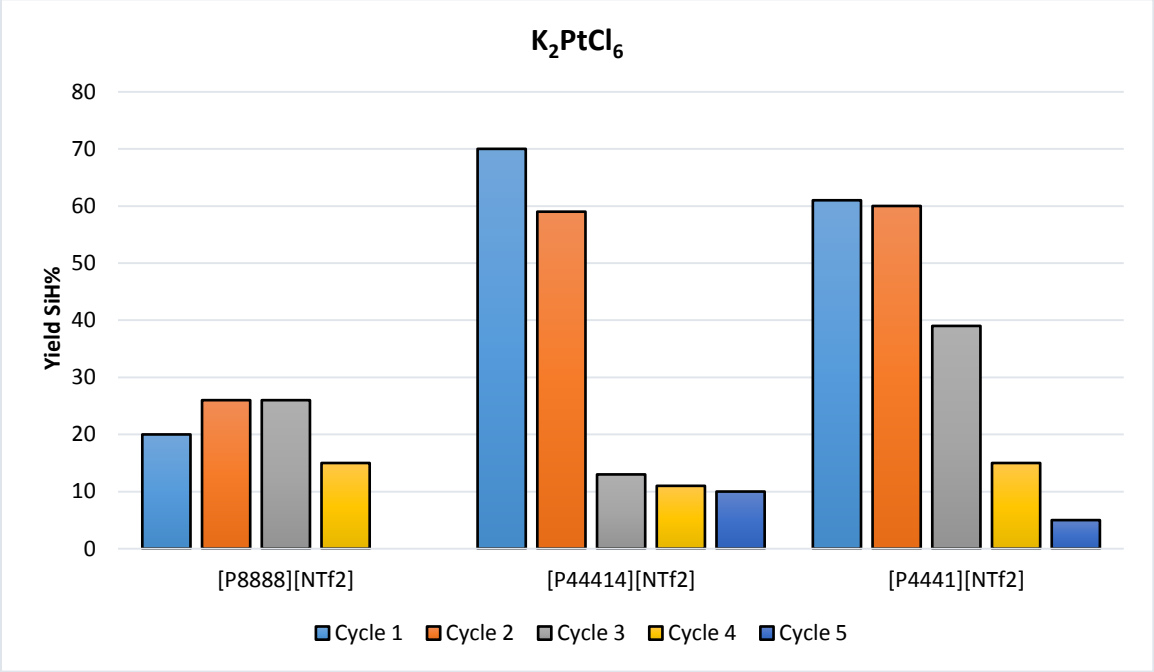


Figure S8. Yield of hydrosilylation reaction using K_2PtCl_4 as catalyst in $[P_{8888}][NTf_2]$, $[P_{44414}][NTf_2]$ and $[P_{4441}][NTf_2]$

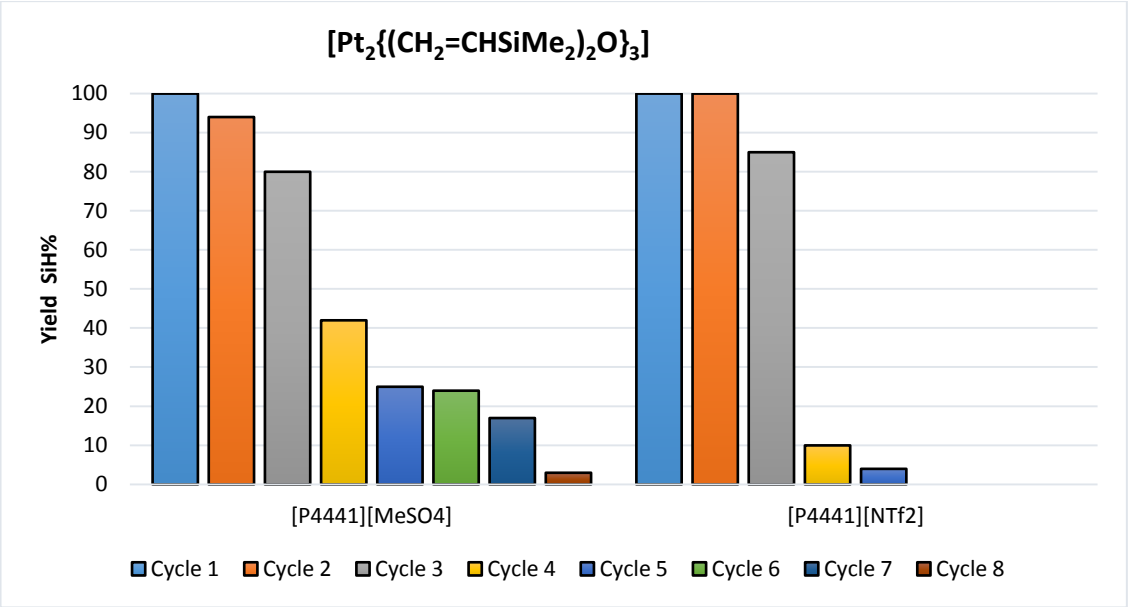


Figure S9. Yield of hydrosilylation reaction using **$[Pt_2\{(CH_2=CHSiMe_2)_2O\}_3]$** as catalyst in $[P_{4441}][MeSO_4]$ and $[P_{4441}][NTf_2]$

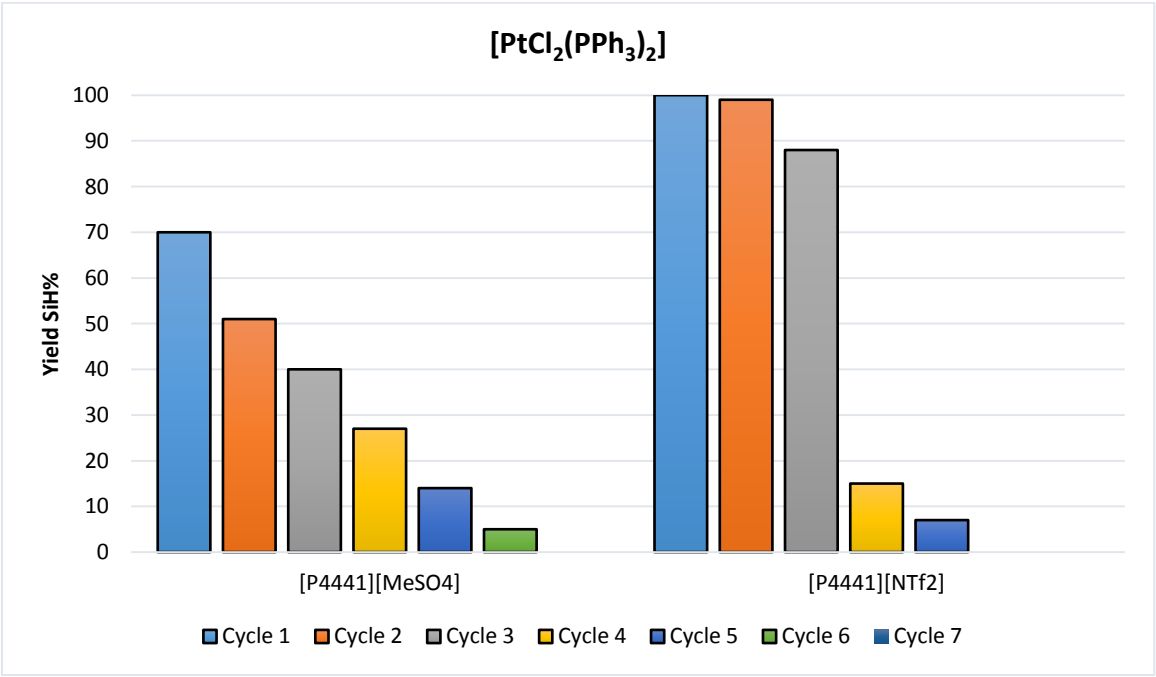


Figure S10. Yield of hydrosilylation reaction using $[PtCl_2(PPh_3)_2]$ as catalyst in $[P_{4441}][MeSO_4]$ and $[P_{4441}][NTf_2]$

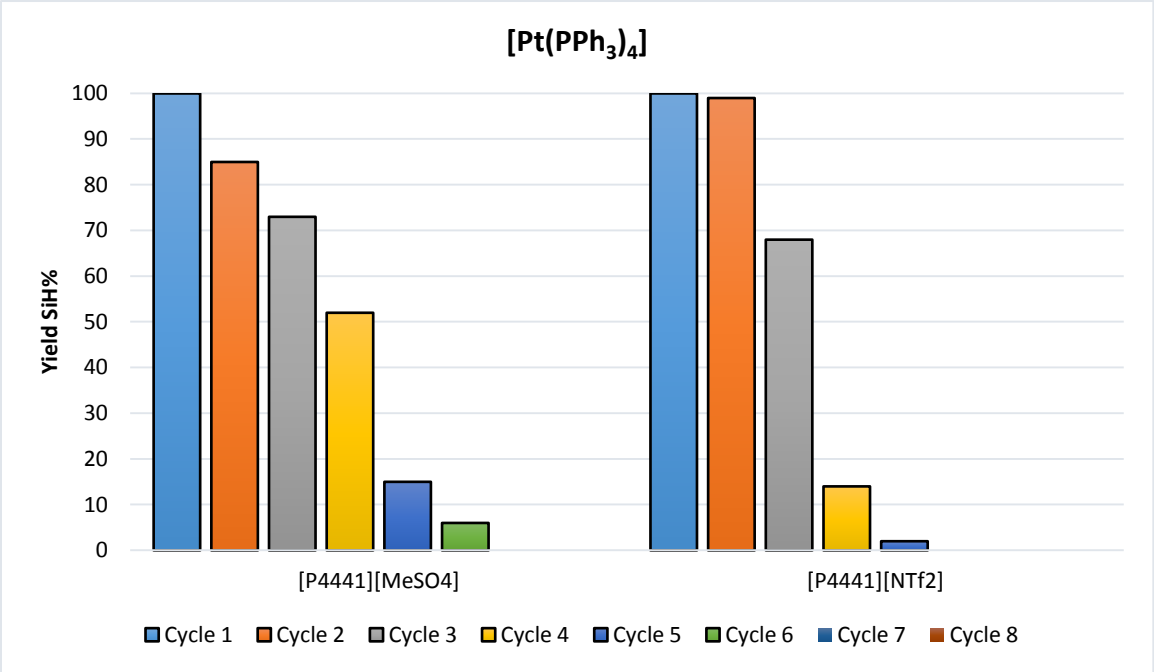


Figure S11. Yield of hydrosilylation reaction using $[Pt(PPh_3)_4]$ as catalyst in $[P_{4441}][MeSO_4]$ and $[P_{4441}][NTf_2]$

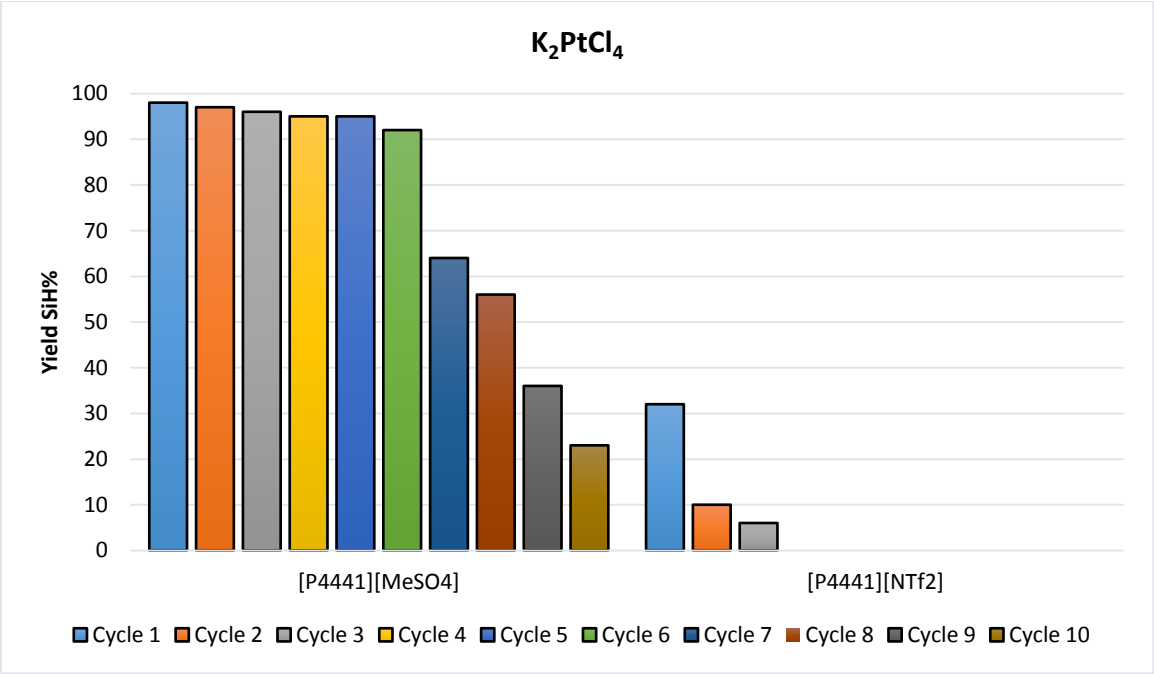


Figure S12. Yield of hydrosilylation reaction using K_2PtCl_4 as catalyst in $[P_{4441}][MeSO_4]$ and $[P_{4441}][NTf_2]$

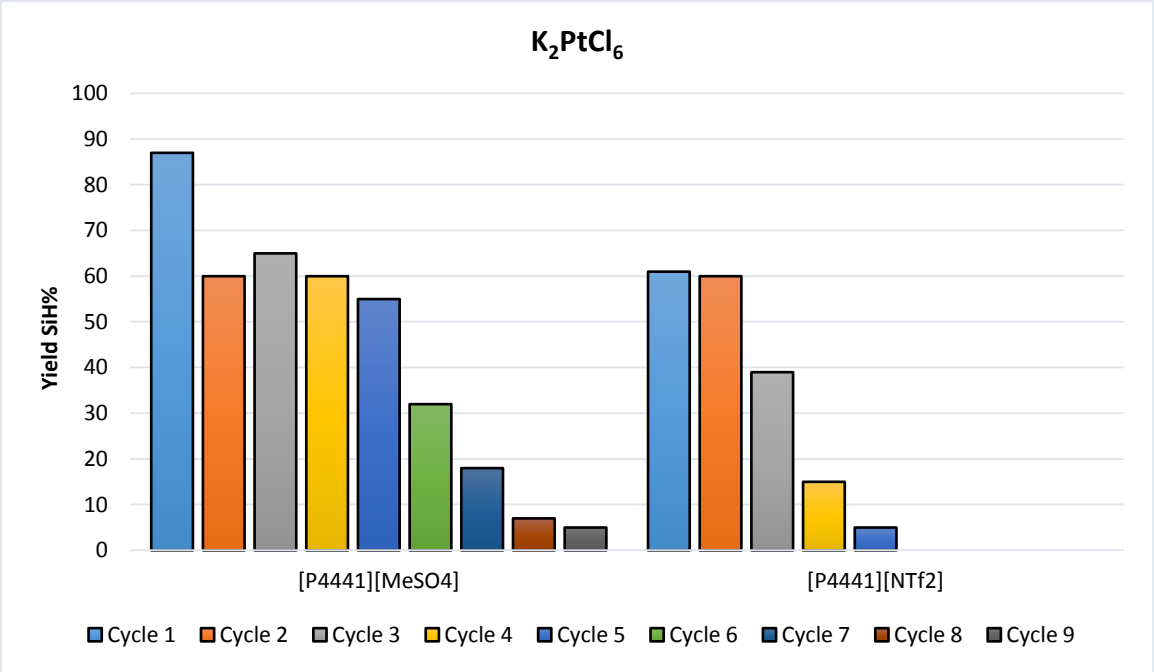


Figure S13. Yield of hydrosilylation reaction using K_2PtCl_6 as catalyst in $[P_{4441}][MeSO_4]$ and $[P_{4441}][NTf_2]$

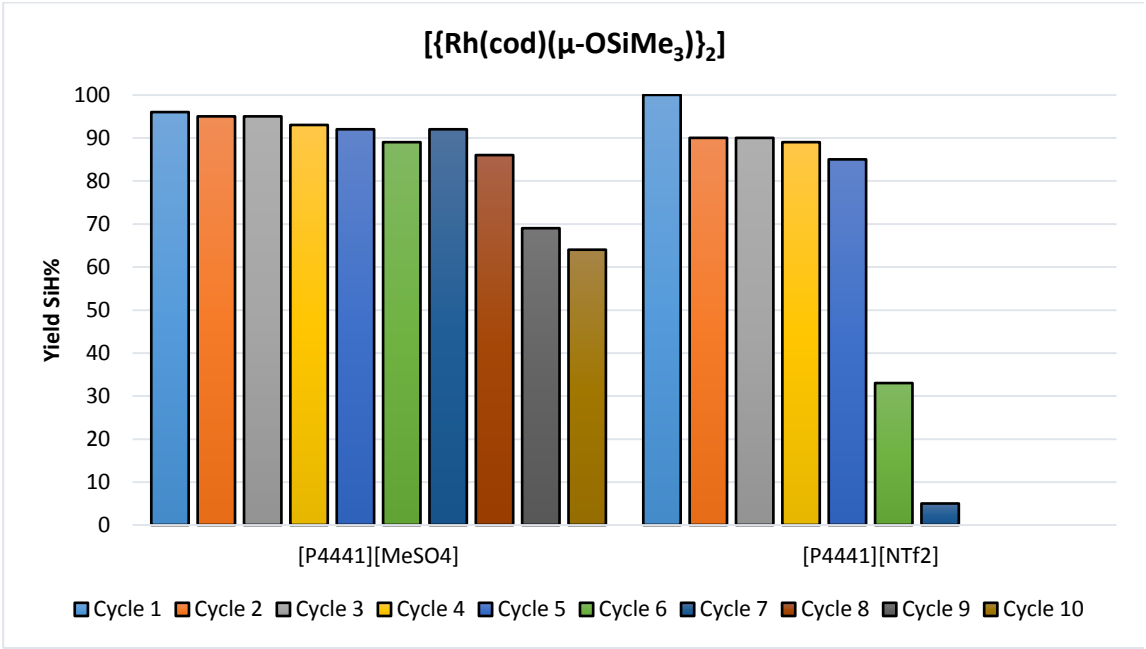


Figure S14. Yield of hydrosilylation reaction using $[Rh(cod)(\mu\text{-}OSiMe_3)]_2$ as catalyst in $[P_{4441}][MeSO_4]$ and $[P_{4441}][NTf_2]$

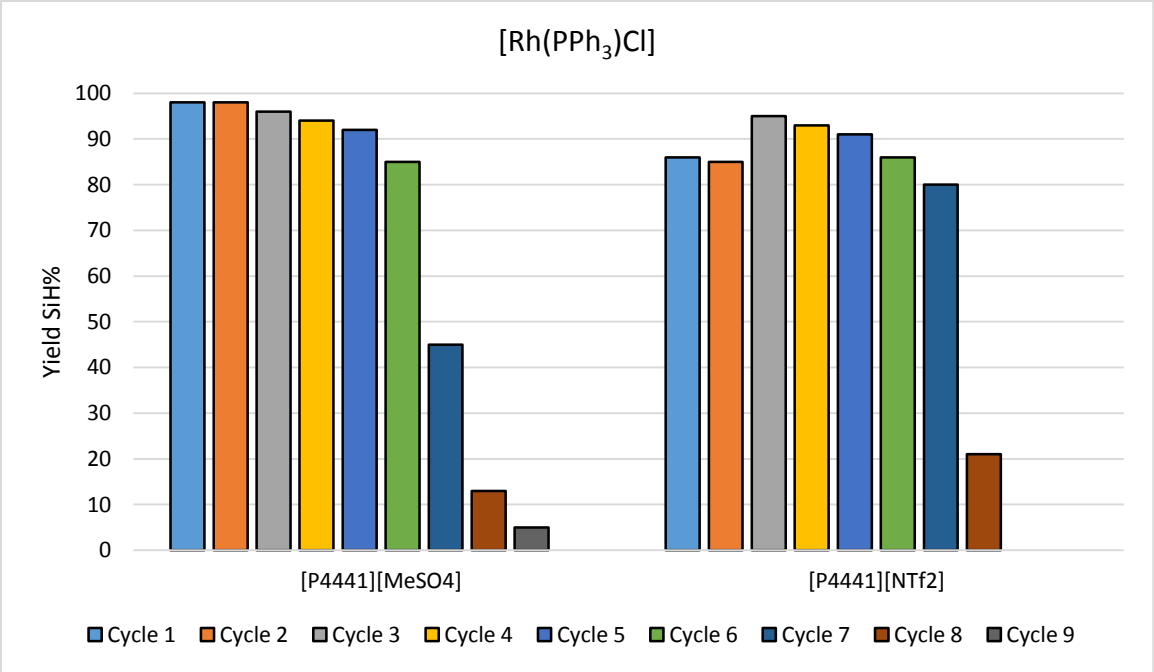


Figure S15. Yield of hydrosilylation reaction using $[Rh(PPh_3)Cl]$ as catalyst in $[P_{4441}][MeSO_4]$ and $[P_{4441}][NTf_2]$

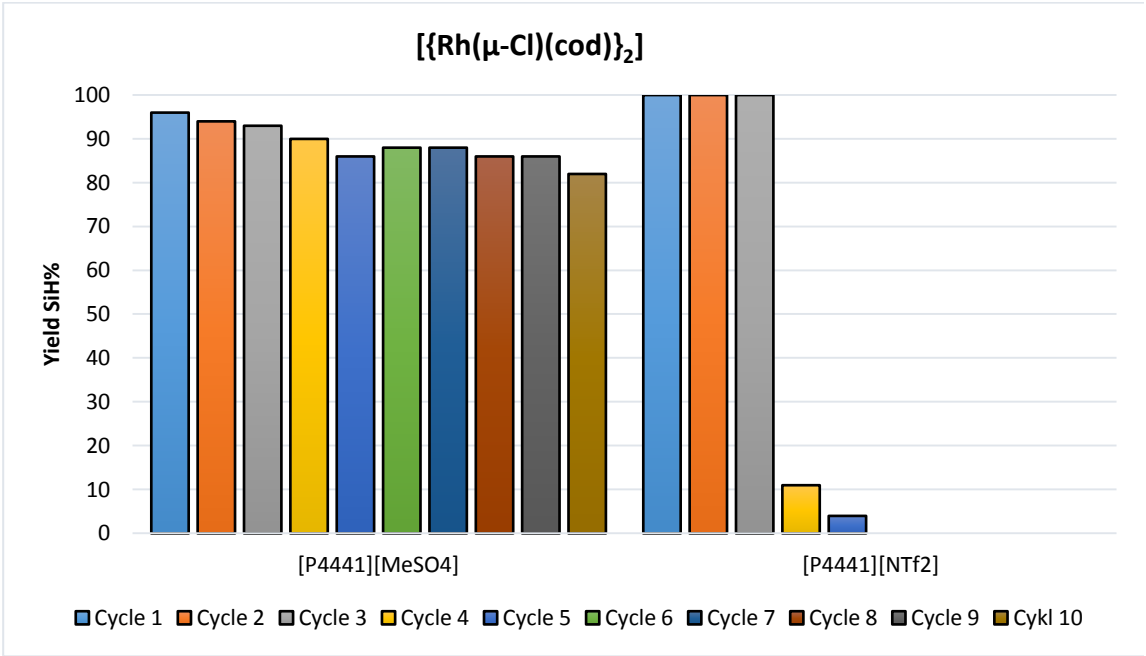


Figure S16. Yield of hydrosilylation reaction using $[Rh(\mu\text{-}Cl)(cod)]_2$ as catalyst in $[P_{4441}][MeSO_4]$ and $[P_{4441}][NTf_2]$

GC chromatograms

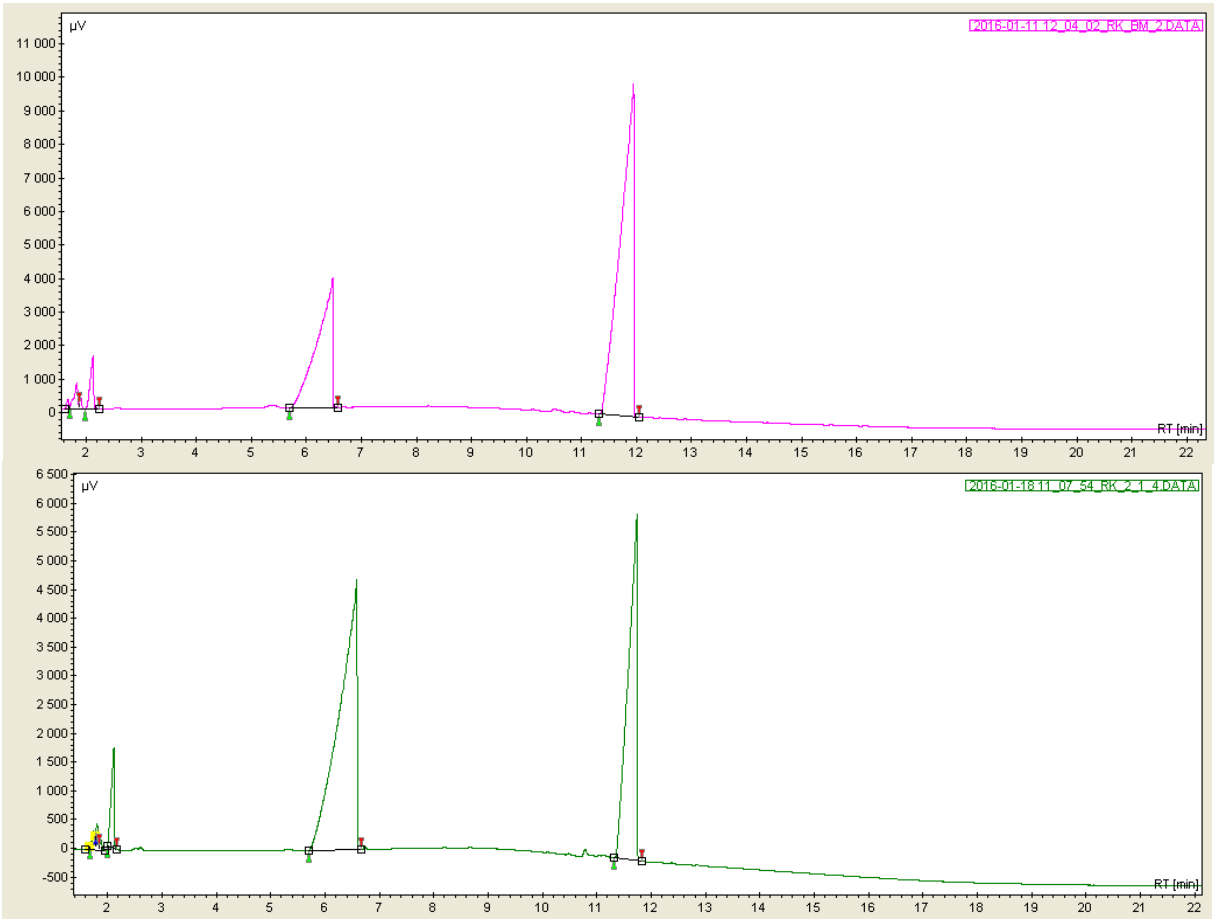


Figure S17. GC chromatograms of post reaction mixture obtained from A batch reaction using $[P_{8888}][NTf_2]$ as solvent for Wilkinson catalyst, B- reaction in microreactor using $[P_{8888}][NTf_2]$ as solvent for catalyst; retention times 1.5-2.0 min – substrates (1-octene, HMTS), 6.4 min – decane (internal standard), 11.7 min – product (octylohepthamethyltrisiloxane)

GC/MS/MS chromatograms

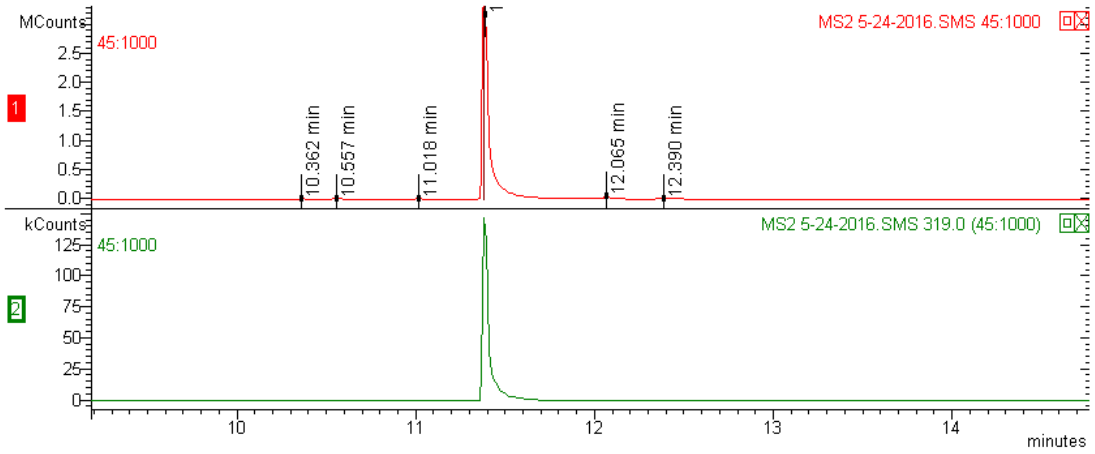


Figure S18. GC-MS chromatogram of octylohepthamethyltrisiloxane obtained from batch reaction using $[P_{8888}][NTf_2]$ as solvent for catalyst; 1- TIC chromatogram, 2- 319M/z chromatogram

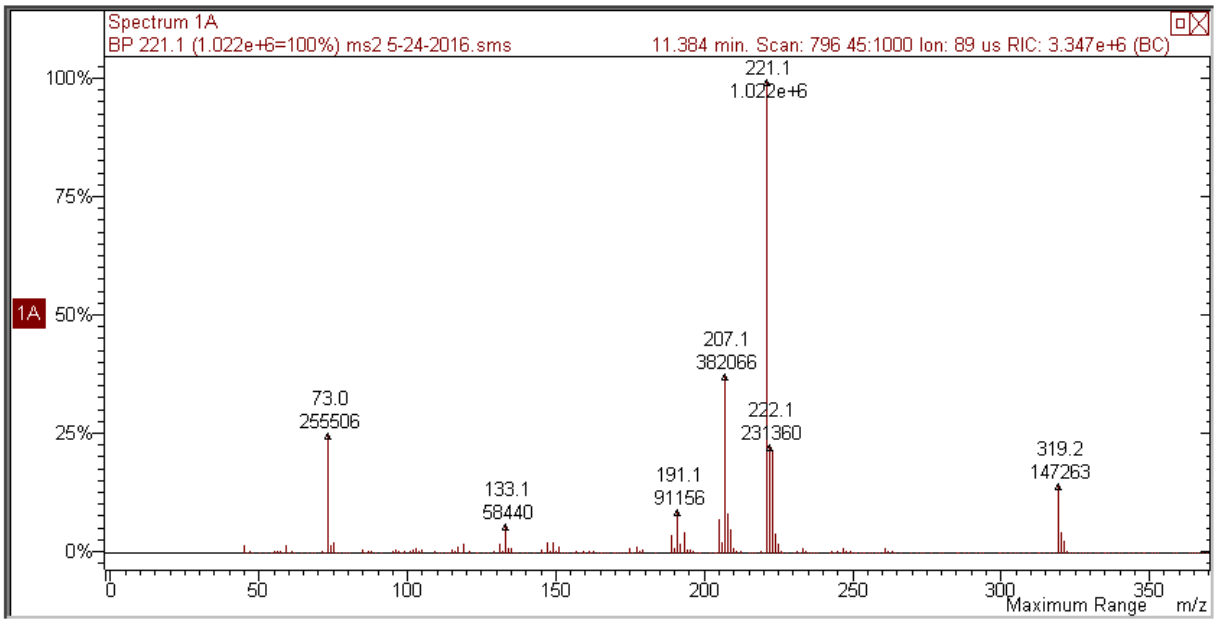
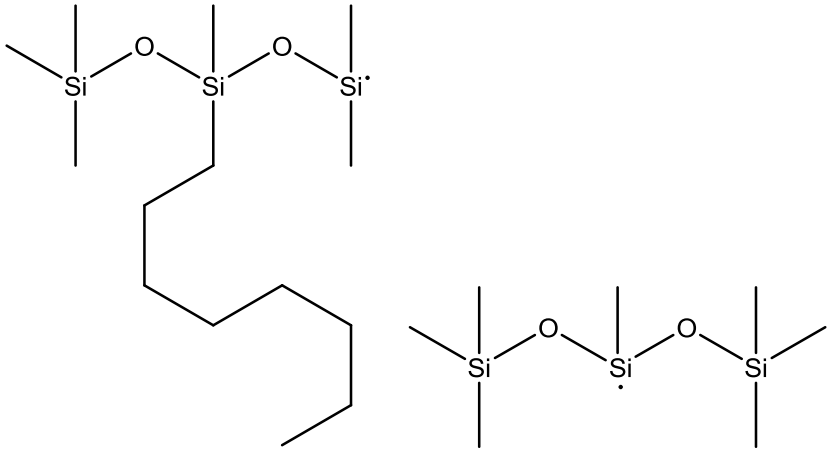
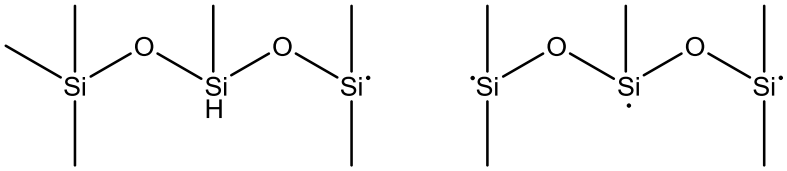


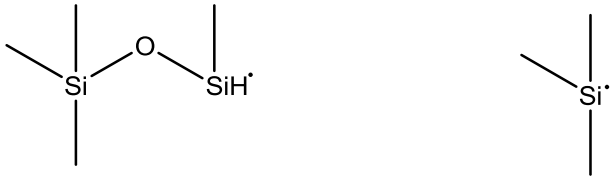
Figure S19. MS spectra of octylhepthamethyltrisiloxane (product) at the retention time 11.38 min obtained from batch reaction using $[P_{8888}][NTf_2]$ as solvent for catalyst



Chemical Formula: $C_{14}H_{35}O_2Si_3^{\bullet}$ Chemical Formula: $C_7H_{21}O_2Si_3^{\bullet}$
Exact Mass: 319,19 Exact Mass: 221,08



Chemical Formula: $C_6H_{19}O_2Si_3^{\bullet}$ Chemical Formula: $C_5H_{15}O_2Si_3^{\bullet}$
Exact Mass: 207,07 Exact Mass: 191,04



Chemical Formula: $C_4H_{13}OSi_2^{\bullet}$ Chemical Formula: $C_3H_9Si^{\bullet}$
Exact Mass: 133,05 Exact Mass: 73,05

Figure S20. Proposed fragmentation of MS spectra of octylhepthamethyltrisiloxane as observed for the peak from GC-MS measurements at the retention time 11.38 min

TGA analysis of Ionic Liquids

Table S1. TGA analysis of ILs at the temperature of 110^{o}C, over the period of 10 h

Ionic Liquid	Loss of weight of ionic liquid [%]
$[P_{8888}][NTf_2]$	**0.25**
$[P_{44414}][NTf_2]$	**0.17**
$[P_{4441}][NTf_2])$	**0.40**
$[P_{4441}][MeSO_4]$	**0.21**

ICP analysis

In order to determine the content of platinum catalyst in the reaction products, the inductively coupled plasma (ICP) technique was used. Unfortunately, the initial concentration of the used catalyst (1 x 10^{-4} mole of Pt/Rh in the ionic liquid) was close to the limit of detection of used instrument. For samples from the reaction mixture containing the product, the concentration of platinum/rhodium was below the limit of detection and thus we could not confirm quantitatively the amount of platinum/rhodium catalyst presence in the product.

IC chromatograms

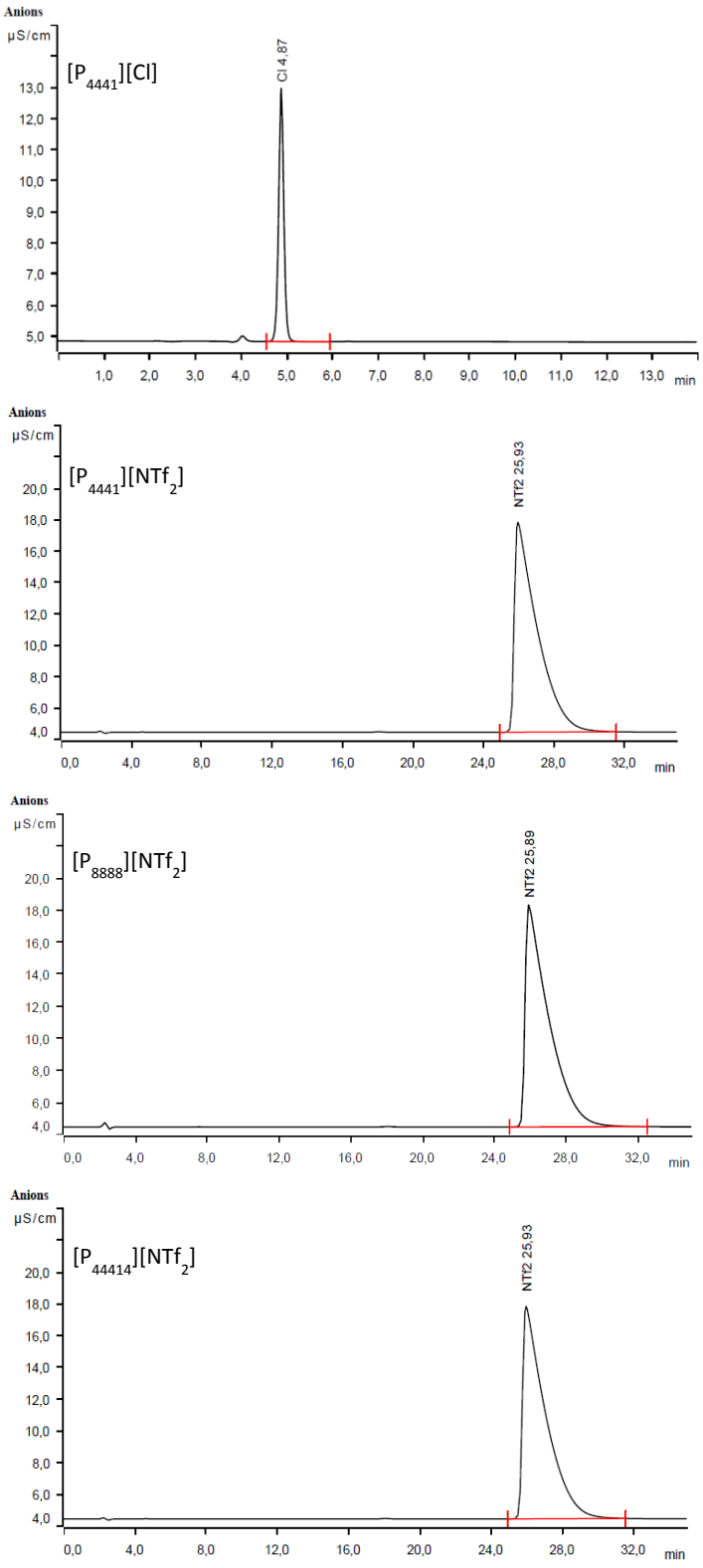


Figure S21. IC chromatograms of synthesized ionic liquids with [NTf2]- anion from their chloride precursors. No peak observance at ~4.9 min means that $[Cl]^-$ content in ionic liquid is below limit of detection.