Ammonium Tagged Hoveyda-Grubbs Catalyst Immobilized on Yolk/Shell Silica Gels with a Hydrophobic Shell for Olefin Metathesis Reactions

Bengi Özgün ÖZTÜRK^{a*}, Aleyna HİLLİK^a, Beyza Nur KÜÇÜK^{b, c}, Fatih INCI^{b,}

^b UNAM—National Nanotechnology Research Center, Bilkent University, 06800 Ankara, TURKEY

^c Institute of Materials Science and Nanotechnology, Bilkent University, 06800, Ankara, TURKEY

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^a Hacettepe University, Faculty of Science, Chemistry Department, 06800, Beytepe-ANKARA, TÜRKİYE e-mail: <u>bengi04@hacettepe.edu.tr</u>, Tel: +90312 297 62 99



Figure S 1. High contrast TEM images of nano-SiO₂ (1) core and particle size distribution graph.



Figure S 2. High contrast TEM images of nano-SiO₂ (2) and particle size distribution graph



Figure S 3. High contrast TEM images of non-etched BTME@SiO₂ (1) (without any purification protocol)



Figure S 4. High contrast TEM images of non-etched BTME@SiO₂ (2) (without any purification protocol)



Figure S 5. High contrast TEM images of etch-BTME@SiO $_2$ (1)



Figure S 6. High contrast TEM images of etch-BTME@SiO₂ (2)



Figure S 7. SEM images of etch-BTME@SiO₂ (1)



Figure S 8. SEM images of etch-BTME@SiO₂ (2)



Figure S 9. XPS analysis of Ru@SiO₂



Figure S 10. XPS spectrum of Ru@etch-BTME@SiO₂ (1((Please note that ruthenium peak was not observed due to the penetration limit of XPS (\approx 10 nm), indicating the confinement of ruthenium in inner core.



Figure S 11. High resolution TEM images of Ru@etch-BTME@SiO $_2(1)$



Figure S 12. EDX line analysis of Ru@etch-BTME@SiO₂



Figure S 13. In filtrate analysis of RCM reactions



Figure S 14. Water-contact angle measurements of a) nano-SiO₂ (51°) and b) Ru@etch-BTME@SiO₂ (139°)

Catalyst	Ru	Conv.	Time	TON	Ref.
	%	%	(h)		
Ru (Aquamet)	1	97	0.5	97	[1]
Ru@(Al)MIL-101-	0.05	53	24	1060	[2]
NH ₂ ·HCl					
$Ru@SiO_2(2)@Fe_2O_3$	0.1	77	8	770	[3]
Ru@SBA-15	0.05	60	1	1200	[4]
Ru@etch-	0.05	60	24	1200	This
BTME@SiO ₂					study

Table S1. The comparison of different catalysts in litereature

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