Supporting Information (SI)

Selective partial hydrogenation of methyl linoleate using highly active palladium nanoparticles in polyethylene glycol

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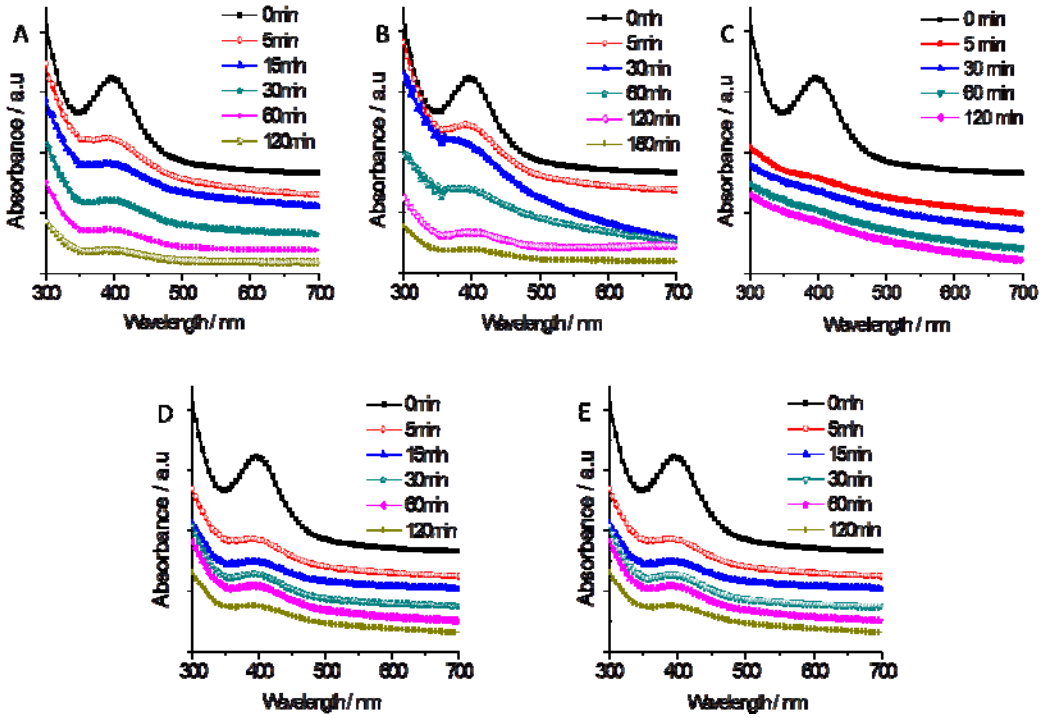

Fig S1. UV-vis spectra of $Pd(OAc)_2$/PEG400 (A), $Pd(OAc)_2$/PEG600 (B), $Pd(OAc)_2$/PEG1000 (C), $Pd(OAc)_2$/PEG2000 (D) and $Pd(OAc)_2$/PEG4000 (E).

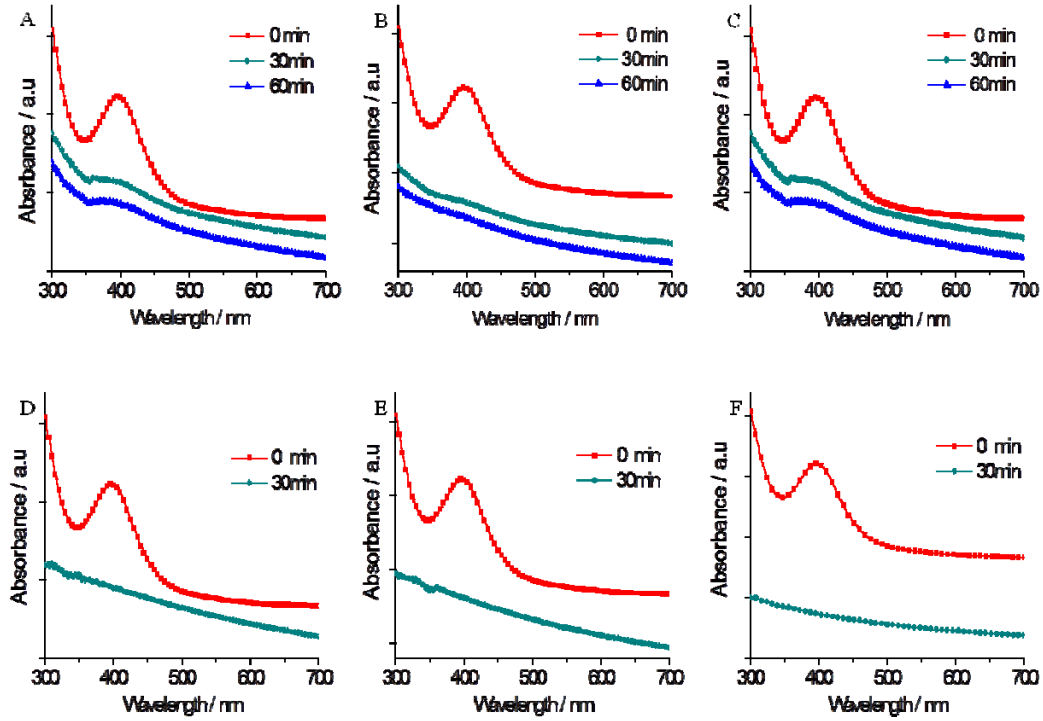

Fig S2. UV-vis spectra of $Pd(OAc)_2$/PEG2000 and $Pd(OAc)_2$/PEG4000 with different

Pd concentration: (A) Pd/PEG2000=0.02mmol/g; (B) Pd/PEG2000=0.01mmol/g; (C) Pd/PEG2000=0.005mmol/g; (D) Pd/PEG4000=0.02mmol/g; (E) Pd/PEG4000=0.01mmol/g; (F) Pd/PEG4000=0.005mmol/g.

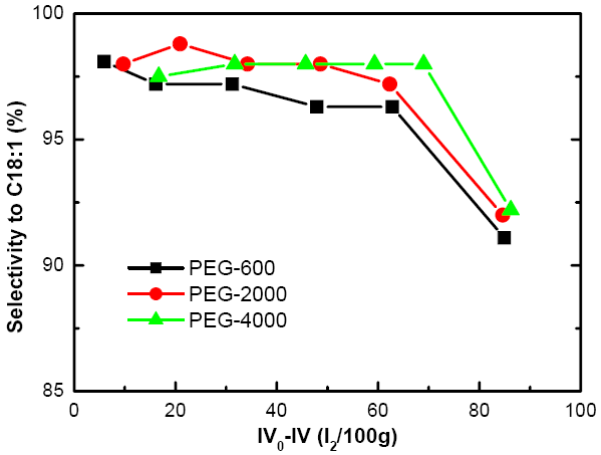

Fig S3. The methyl oleate selectivity with different PEG. (The selectivity= methyl oleate (mol)/converted methyl linoleate (mol); IV_0 corresponded to the iodine value of methyl linoleate (172), IV corresponded to the iodine value of hydrogenated product.)

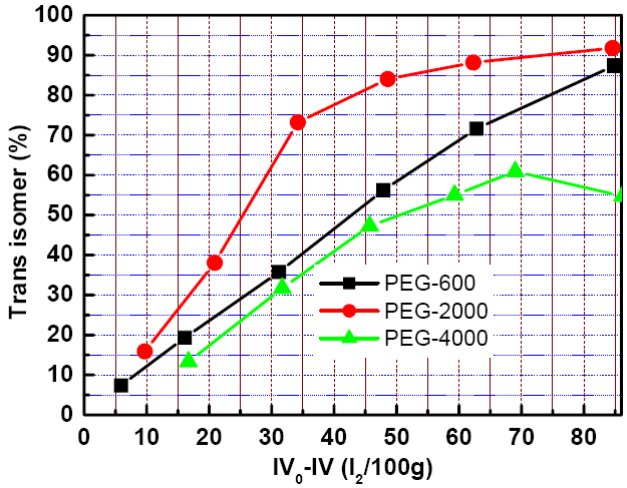

Fig S4. The *trans* isomer selectivity with different PEG. (IV_0 corresponded to the iodine value of methyl linoleate (172), IV corresponded to the iodine value of hydrogenated product.)

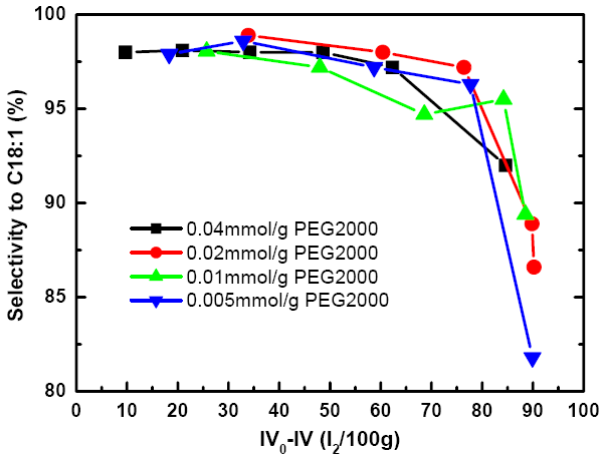

Fig S5. The methyl oleate selectivity at different Pd concentration in PEG2000.

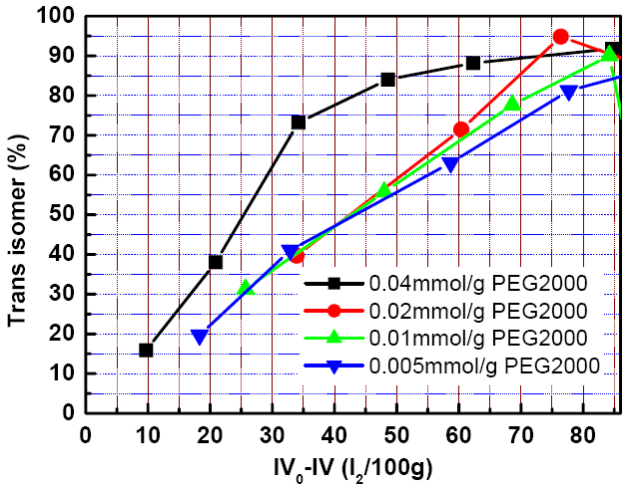

Fig S6. The *trans* isomer selectivity at different Pd concentration in PEG2000.

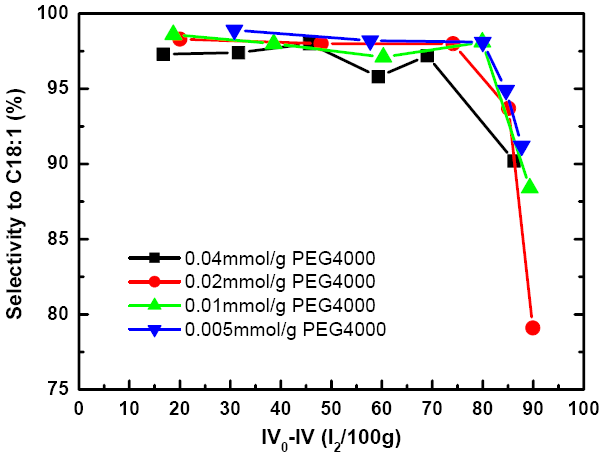

Fig S7. The methyl oleate selectivity at different Pd concentration in PEG4000.

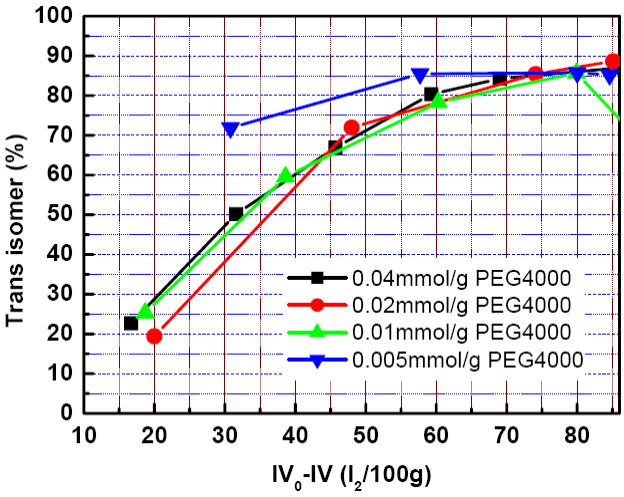

Fig S8. The *trans* isomer selectivity at different Pd concentration in PEG4000.

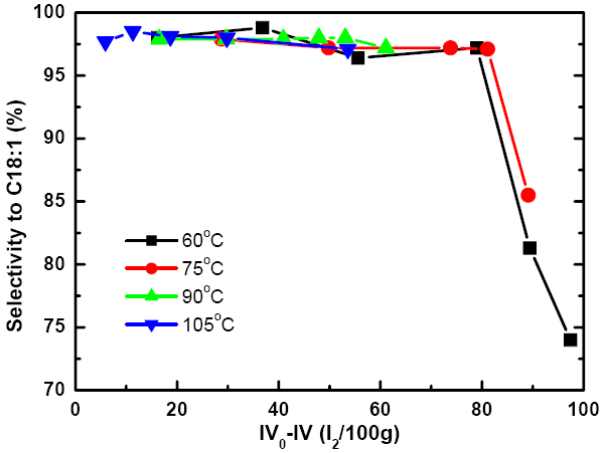

Fig S9. The methyl oleate selectivity at different reduction temperatures.

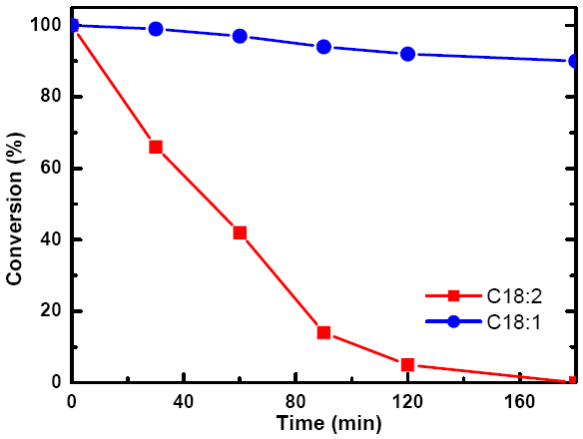

Fig S10. Hydrogenation rate of methyl oleate in comparison with methyl linoleate in the presence of Pd-PEG4000 catalyst.

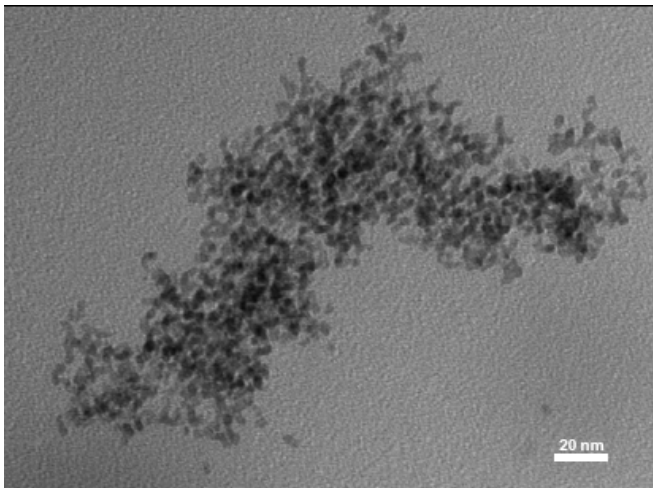

Fig S11. Pd-PEG4000 has be characterized by TEM after the recycling.

Table S1. Comparation of presented work and wetness impregnation for Pd catalysts

Nano-Pd catalyst	Reducing agent	Temp.& Time	Atmosphere	Lab instrument	Experimental skill
Pd-PEGn	PEG	75°C, 0.5-1.0 h	Air	-	Middle
Pd/SiO_2	H_2 (***Handling carefully!***)	Calcined at 300-400 °C for 2-3 h, and reduced at 250-300 °C for 2-4 h under a H_2 flow.	O_2 for calcination, H_2 for reducing	Tube furnace	High

Table S2. Comparison of *trans*-isomers produced in hydrogenation of FAMEs by different Pd catalysts.

Pd catalyst	Reaction conditions	Biodiesel	*Trans* isomers/C18:0 (%)	IV of hydrogenated product (I_2/100g)	Reference
Pd/SiO_2	80°C, **30** atm of H_2	Rapeseed oil FAME	29.9%/8.5%	75	J Am Oil Chem Soc (2013) 90:1431-1438
$Pd/ImS3\text{-}12@Al_2O_3$	80°C, **75** atm of H_2	Soybean oil FAME	33%/18%	65	Applied Catalysis A: General (2012) 433-434:

					109-114
Pd/C 5%	80°C, **75** atm of H_2	Soybean oil FAME	24%/50%	31	Applied Catalysis A: General (2012) 433-434: 109-114
Pd(0)/BMI·BF4	80°C, **10** atm of H_2	Soybean oil FAME	32%/5%	81	Catal. Sci. Technol., (2011) 1: 480-488
Pd(0)/BMI·BF4	80°C, **75** atm of H_2	Soybean oil FAME	24%/11%	75	
Pd-PEGn	75°C, **10** atm of H_2	Sunflower oil FAME	24%/6%	77	This work