

Supporting Information for

Tandem Isomerisation-Metathesis Catalytic Processes of Linear Olefins in Ionic liquid Biphasic System

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Experimental

General Remarks. All manipulation of complexes were conducted under Ar using dry-boxes or standard Schlenk techniques. Chemicals were treated as follows: 1-hexene (Acros) and toluene, distilled from Na/benzophenone; *trans*-3-hexene, PdCl₂(NCPPh)₂, propylbenzene, ((1,3-bis(mes)H₂Im)(PCy₃)(Cl)₂Ru(=CHPh) **2**, and Ru₃(CO)₁₂ (all from Aldrich); acetone-d₆, benzene-d₆, CDCl₃ (Cambridge Isotope) and other solvents, used as received. RuHCICO(PPh₃)₃,¹ RuHCICO(PCy₃)₃,² **4**,³ **5**,⁴ IIs (BMI.PF₆ and DMI.PF₆)⁵ were synthesized according to literature procedures. GC analyses were performed using an Agilent 6820 instrument equipped with a capillary column (DB-17–0.25 mm; 25 m S 0.32 mm). GC-MS data were recorded with a Shimadzu QP2010.

Typical isomerisation procedure. The isomerisation catalyst (2 mmol) was charged in a Schlenk flask and maintained under vacuum for 30 min. A solution of 1-hexene (0.5 mL, ≈ 4 mmol) in toluene was introduced into the reaction system by syringe and the mixture was stirred at 45 °C for 24 hours. Samples were taken periodically for GC analysis.

Typical tandem metathesis/isomerization. Toluene (4 g), *trans*-3-hexene (0,5 mL, ≈ 4 mmol) and propylbenzene (30 mg) as internal standard were charged into a Schlenk flask under Ar. A sample was taken to CG analyses. In a glove box a second Schlenk was loaded with both, metathesis (0.01 mmol) and isomerisation (0.02 mmol) catalysts. For reactions conducted with IL as co-solvent, IL (500 mg) was added to the system at this point. The toluene solution was transferred to the flask containing the catalysts mixture via syringe. A

vertical condenser followed by a oil bubbler was fitted in the reactor flask and the reaction was vigorously stirred at 45 °C for 24 hours. Samples were periodically removed from the organic phase for GC analysis. The products mixture was hydrogenated with Pd/C and H₂ (4 atm) in a Fisher-Porter bottle, analysed by GC-MS. Peaks were assigned by comparison with authentic alkane standards.

Typical Chromatograms

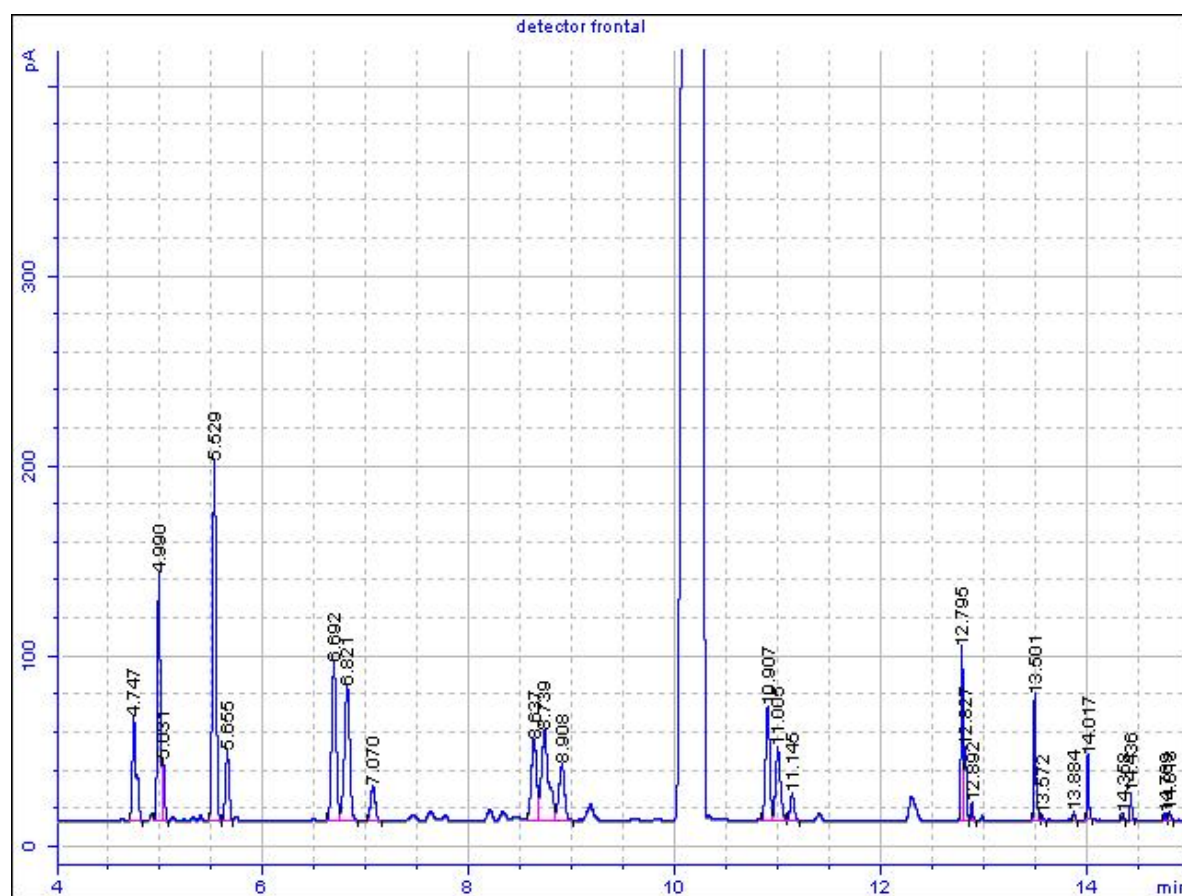


Figure 1. GC analysis. Reaction conditions: *trans*-3-hexene (2 mmol), toluene (4mL), **5** (0.01 mmol), RuHClCO(PPh₃)₃ (0.02 mmol), 45 °C, 24 h.

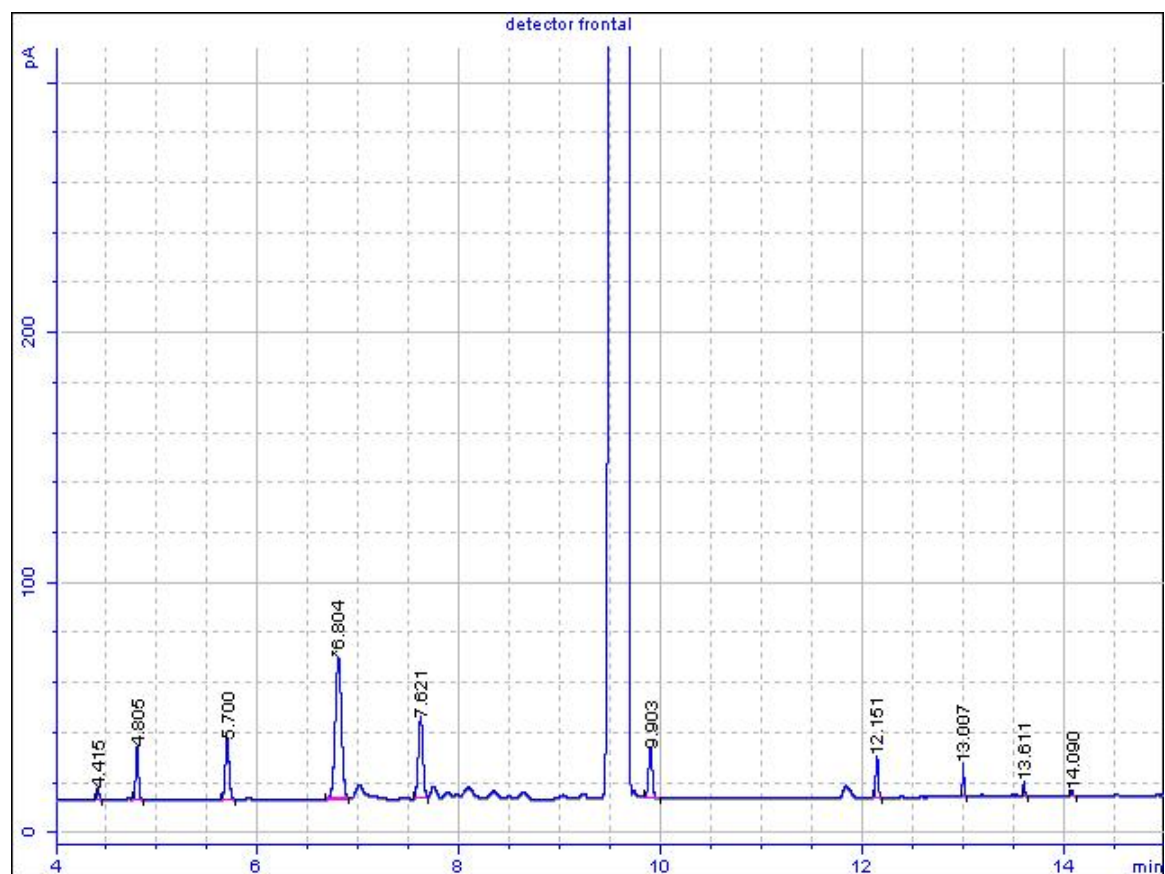


Figure 2. GC analysis after hydrogenation. Reaction conditions: *trans*-3-hexene (2 mmol), toluene (4mL), **5** (0.01 mmol), RuHClCO(PPh₃)₃ (0.02 mmol), 45 °C, 24 h.

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