

# Application of 2-methyltetrahydrofuran as a “green solvent” in olefin metathesis reactions

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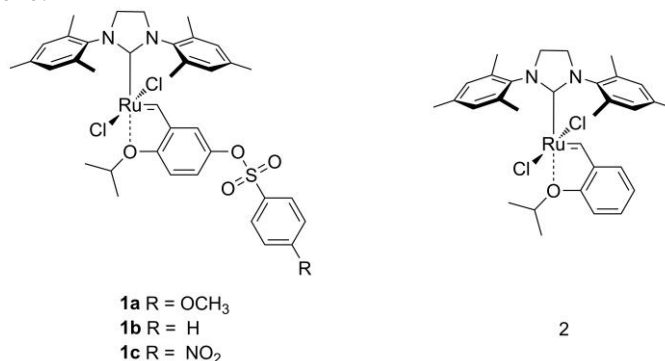
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Ruthenium-catalyzed olefin metathesis reactions represent an attractive and powerful transformation for the formation of new C=C double bonds.<sup>1</sup> As this reaction becomes an important part of industrial processes,<sup>2,3</sup> there is a growing need for eco-friendly solvents that are applicable in large scale synthesis. In our study we used 2-methyltetrahydrofuran which is derived from renewable resources like oat hulls and corn cobs. These contain pentoses, which after dehydration give furfural, which is then catalytically reduced to 2-methyltetrahydrofuran.<sup>4</sup> 2-MeTHF is considered an environmentally friendly compound and its use is advocated by the ACS Green Chemistry Pharmaceutical Roundtable.<sup>5</sup>

In our research we used 2-MeTHF in the most important olefin metathesis reactions. For this study we used newly synthesized second generation Hoveyda-type catalysts **1a-c** bearing symmetrical NHC and modified styrenes, in comparison with the commercially available second generation Hoveyda catalyst **2** (figure 1). To extensively examine the performance of the catalysts, we applied them in a set of model reactions. For comparison, these catalysts were also tested in common solvents used in olefin metathesis: dichloromethane and toluene.<sup>6</sup>



**Figure 1.** Newly-synthesized second generation Hoveyda-type catalysts **1a-c** and second generation Hoveyda catalyst **2**.

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<sup>2</sup> Czaban, J.; Torborg, C.; Grela, K., "Olefin Metathesis: from Academic Concepts to Commercial Catalysts" in *Sustainable Catalysis: Challenges and Practices for the Pharmaceutical and Fine Chemical Industries*, First Edition; Dunn, P. J.; Hii, K. K. (Mimi); Krische, M.J.; Williams, M. T., Eds.; John Wiley & Sons, Inc., **2013**, 163-214

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<sup>5</sup> Antonucci, V.; Coleman, J.; Ferry, J. B.; Johnson, N.; Mathe, M.; Scott, J. P.; Xu, J. *Org. Process Res. Dev.*, **2011**, 15 (4), 939-941

<sup>6</sup> Smoleń, M.; Kędziorek, M.; Grela, K., *Catal. Commun.*, **2013**, in press

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