

ELECTRONIC SUPPLEMENTARY INFORMATION

Electrogenerated NHC as an Organocatalyst in the Staudinger Reaction.

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Experimental procedure. BMIM-BF₄ was purchased from IOLITEC and used as received. All other reagents were purchased from Aldrich and used as received.

N-benzylideneaniline and *N*-benzylidene-4-methoxyaniline were synthesized following literature methods.¹

Constant current electrolyses were carried out using a glass two-compartment home-made cell. Anolyte (ca. 0.5 ml) and catholyte (ca. 1.5 ml) were separated through a glass disk (porosity 4). The electrode apparent surface areas were 1.0 cm² for the cathodic Pt spiral (99.9%) and 0.8 cm² for the anodic Pt spiral (99.9%). The current density was 15 mA/cm².

Preparative electrolyses were carried out at 60°C, under nitrogen atmosphere, using BMIM-BF₄ as anolyte and catholyte. After the consumption of the number of Faradays per mol of imine reported in Table 1, the current was switched off and imine (1 mmol) was added to the catholyte under stirring; when the dissolution was complete, phenylacetyl chloride (1 mmol) was added. The mixture was kept at 60°C for 2 h. In the cases in which triethylamine was necessary (see Table 1), NEt₃ was added to the catholyte with the imine.

The catholyte was extracted with diethyl ether (10 ml) for three times, the solvent was removed under reduced pressure and the residue was analyzed by ¹H-NMR. The residue was purified by flash-chromatography (*n*-hexane/ethyl acetate = 9/1), affording the corresponding pure β-lactam. All β-lactams are known compounds and gave spectral data in accordance with the ones reported in the literature.

***trans* 1-(4-Methoxyphenyl)-3,4-diphenylazetid-2-one.**² ¹H NMR (200 MHz, CDCl₃): δ 7.36-7.24 (m, 12H), 6.78 (d, *J* = 9.2 Hz, 2H), 4.89 (d, *J* = 2.2 Hz, 1H), 4.24 (d, *J* = 2.2 Hz, 1H), 3.73 (s, 3H). ¹³C NMR (50 MHz, CDCl₃): δ 164.9, 156.1, 137.6, 134.8, 131.0, 129.2, 129.0, 128.6, 127.8, 127.4, 125.9, 118.5, 114.3, 65.1, 63.8, 55.4.

cis 1-(4-Methoxyphenyl)-3,4-diphenylazetididin-2-one in mixture with the trans isomer.² ¹H NMR (200 MHz, CDCl₃): δ 7.37-7.24 (m, 12H), 6.79 (d, *J* = 9.3 Hz, 2H), 5.41 (d, *J* = 6.0 Hz, 1H), 4.97 (d, *J* = 6.0 Hz, 1H), 3.72 (s, 3H).

trans 1,3,4-Triphenylazetididin-2-one.³ ¹H NMR (200 MHz, CDCl₃): δ 7.38-7.21 (m, 14H), 7.09-7.02 (m, 1H), 4.95 (d, *J* = 2.5 Hz, 1H), 4.27 (d, *J* = 2.5 Hz, 1H). ¹³C NMR (50 MHz, CDCl₃): δ 165.6, 137.5, 137.4, 134.7, 129.3, 129.1, 129.0, 128.6, 127.9, 127.4, 125.9, 124.0, 117.2, 65.1, 63.7.

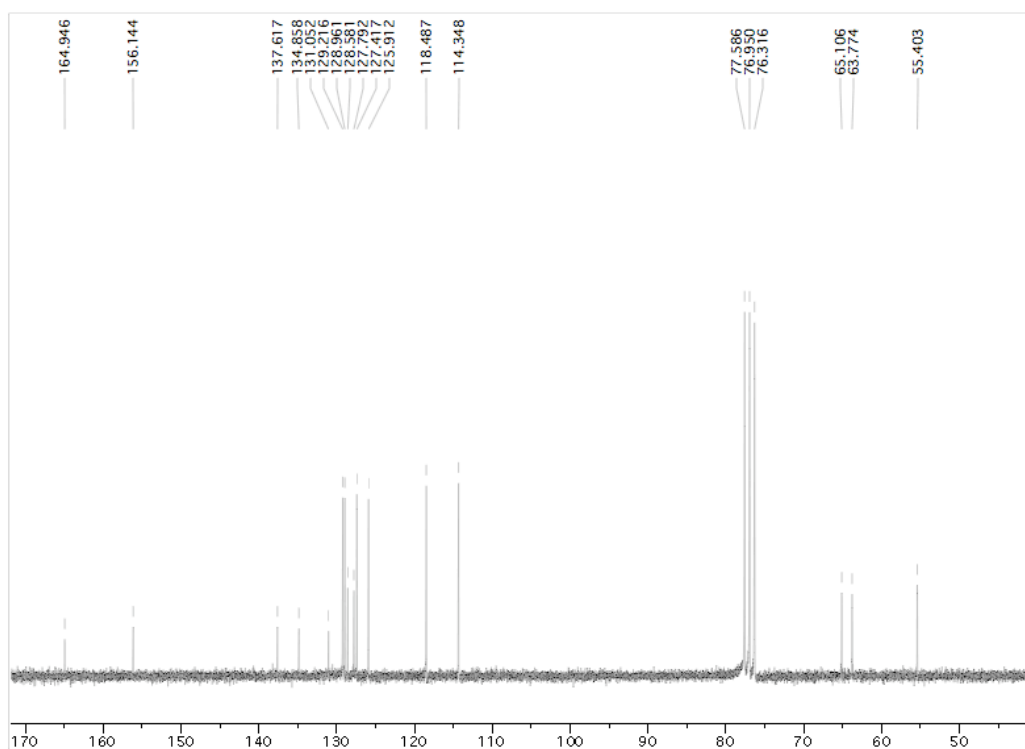
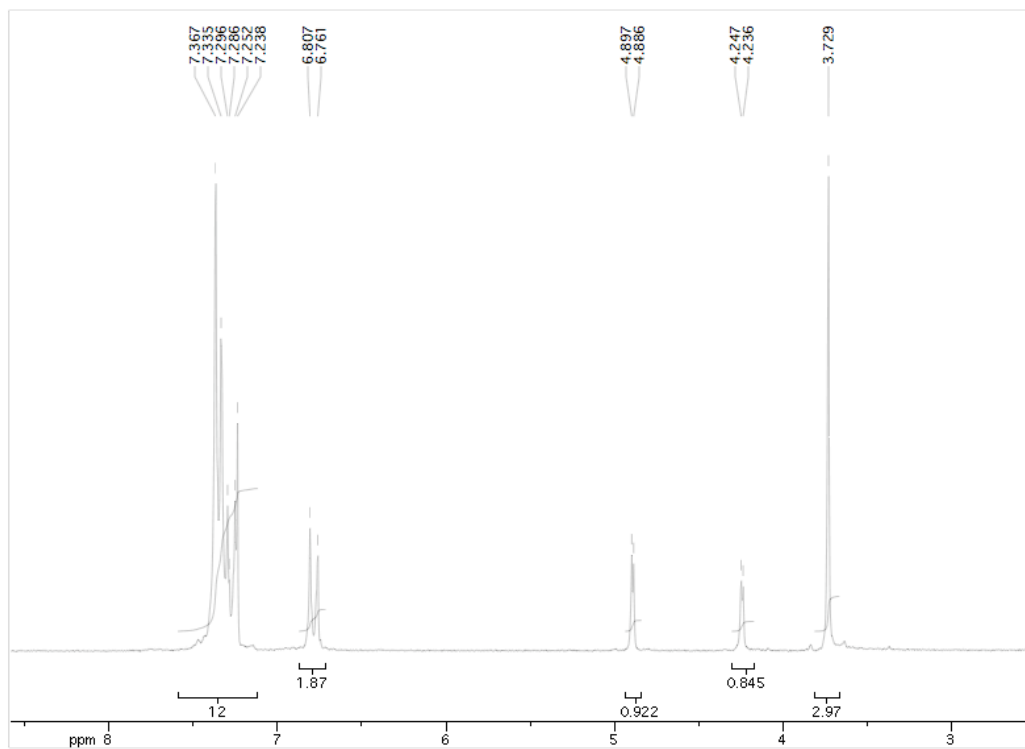
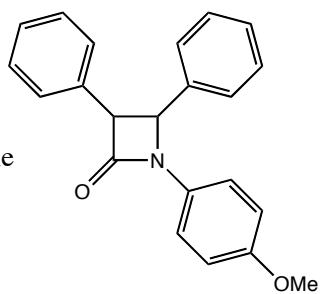
cis 1,3,4-Triphenylazetididin-2-one.³ ¹H NMR (200 MHz, CDCl₃): δ 7.42-7.04 (m, 15H), 5.45 (d, *J* = 6.1 Hz, 1H), 4.99 (d, *J* = 6.1 Hz, 1H). ¹³C NMR (50 MHz, CDCl₃): δ 165.6, 137.6, 134.3, 132.0, 129.1, 129.0, 128.9, 128.2, 128.0, 127.8, 127.1, 124.0, 117.2, 60.3, 51.6.

¹ García Ruano, J. L.; Alemán, J.; Alonso, I.; Parra, A., Marcos, V.; Agiurre, J. *Chem. Eur. J.* **2007**, *13*, 6179-6195.

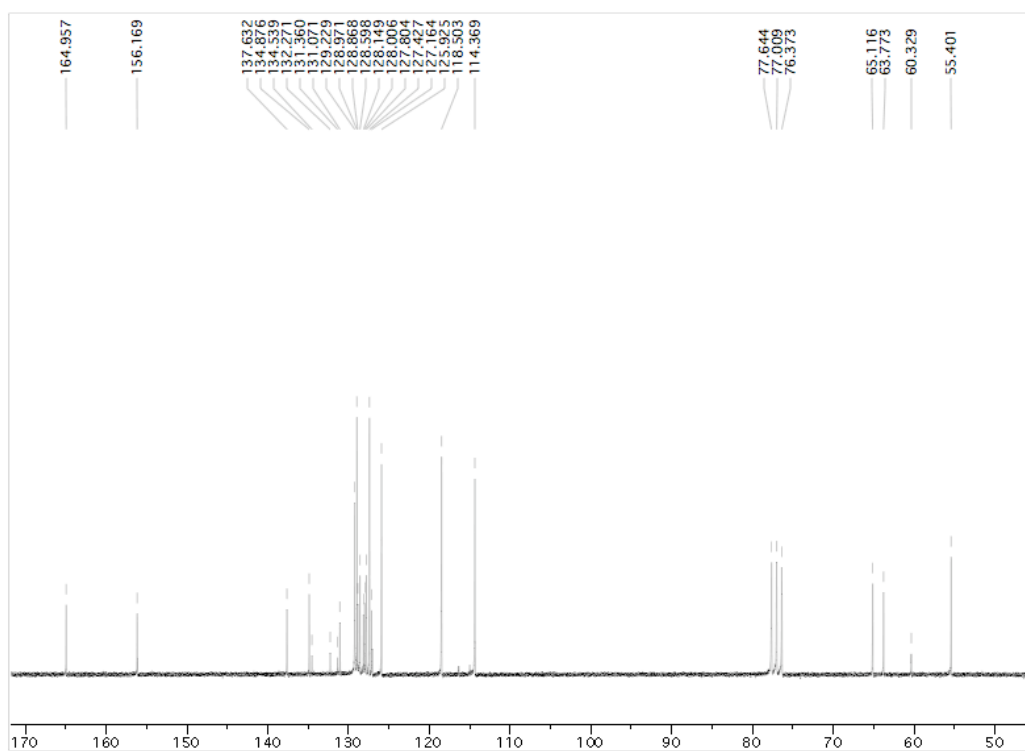
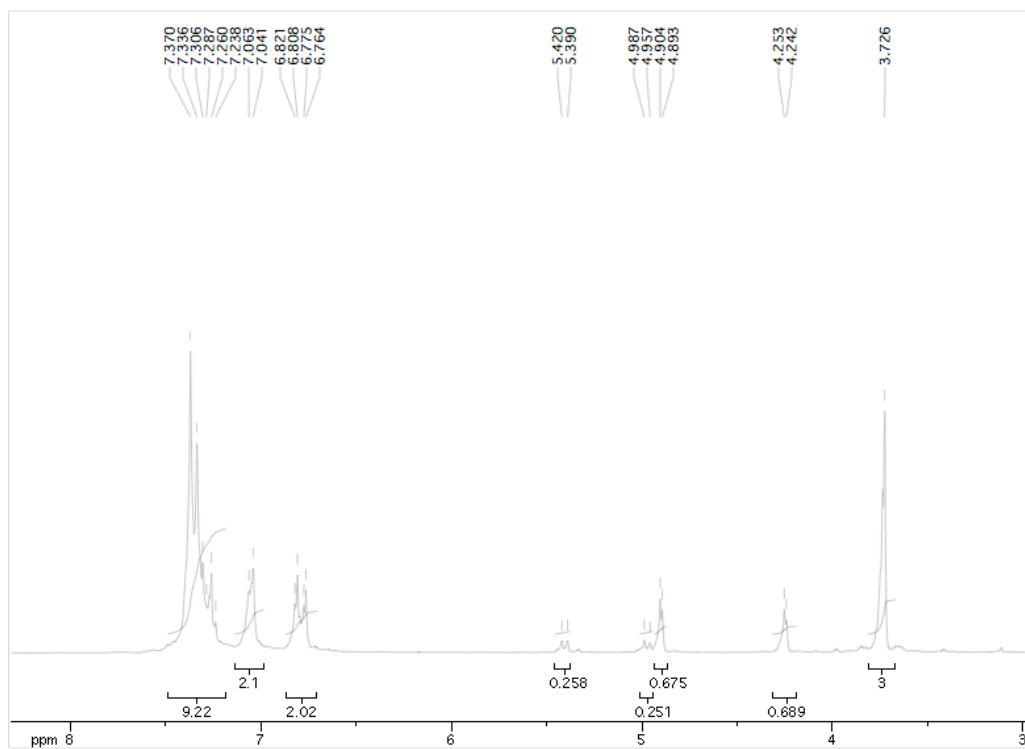
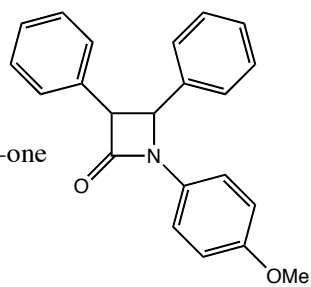
² Lo, M. M.-C.; Fu, G. C. *J. Am. Chem. Soc.* **2002**, *124*, 4572-4573.

³ Bolognese, A.; Diurno, M. V.; Mazzoni, O.; Giordano, F. *Tetrahedron* **1991**, *47*, 7417-7428.

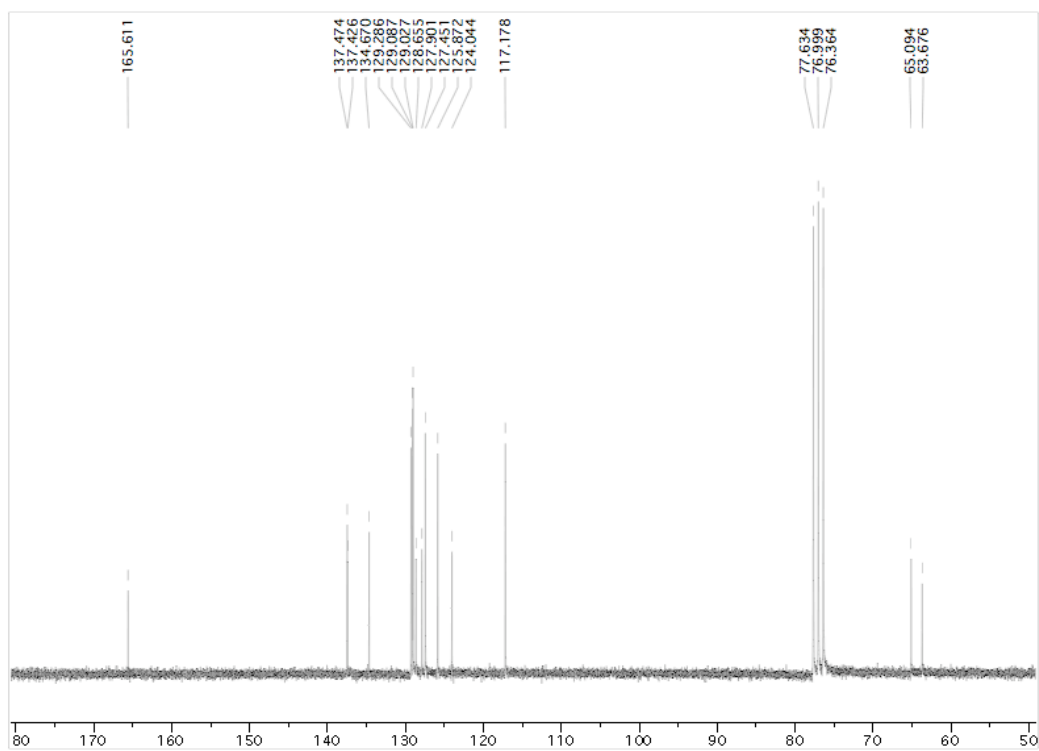
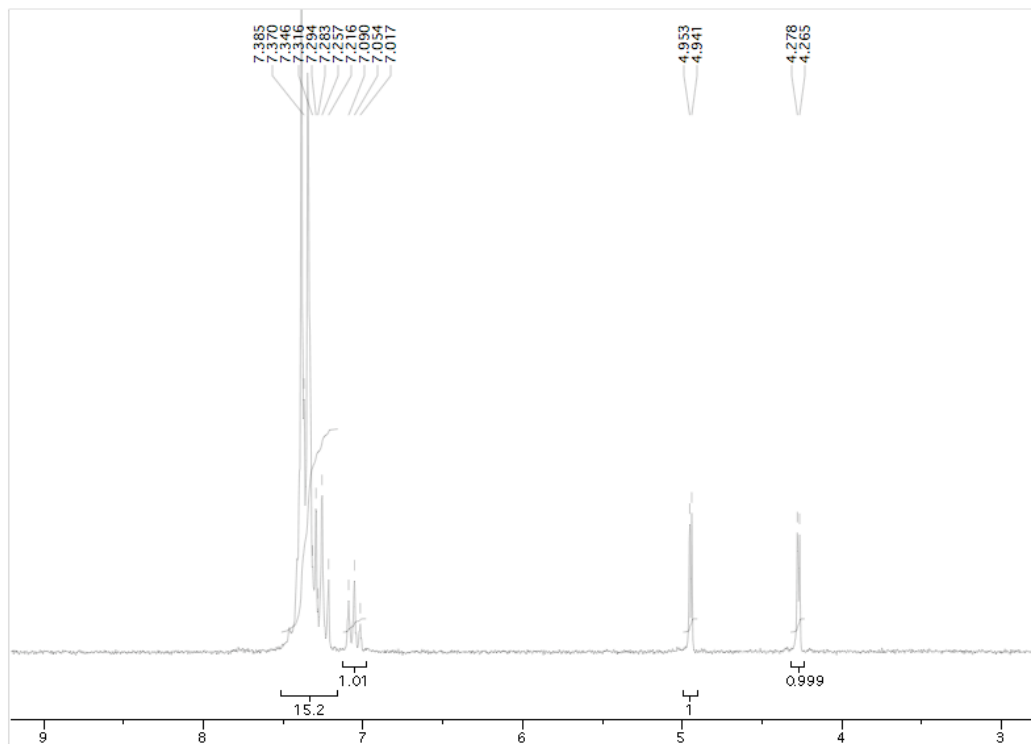
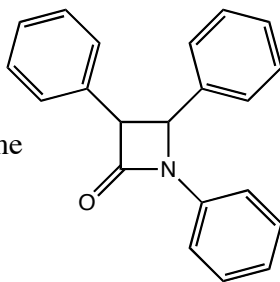
trans 1-(4-methoxyphenyl)-3,4-diphenylazetidin-2-one



cis + trans 1-(4-methoxyphenyl)-3,4-diphenylazetidin-2-one



trans 1,3,4-triphenylazetid-2-one



cis 1,3,4-triphenylazetid-2-one

