Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Tetra-butylphosphonium arginine-based ionic liquid-promoted cyclization of 2-aminobenzonitrile with carbon dioxide

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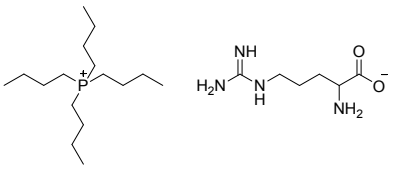
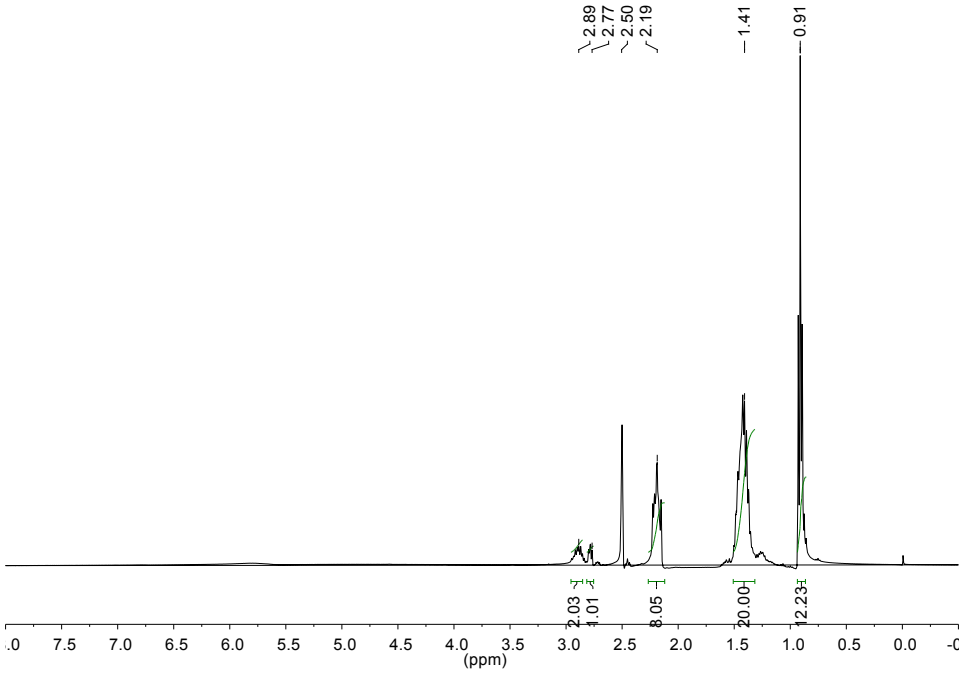
Table of Contents

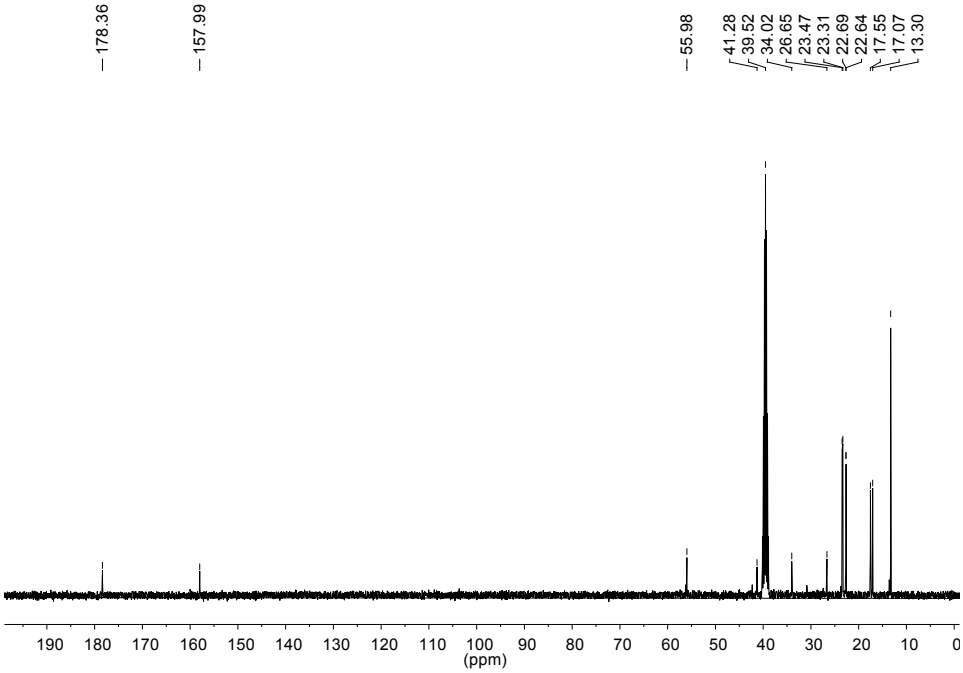
1. ^{1}H NMR and ^{13}C NMR Charts for the catalyst and products



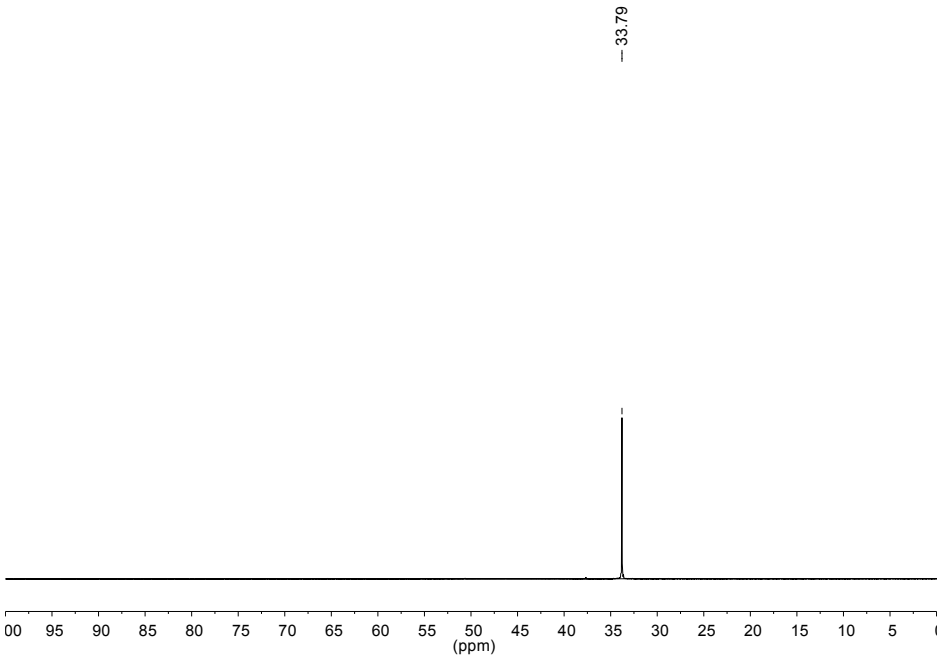
^{1}H NMR (400 MHz, DMSO-d_6) **(fresh prepared)**

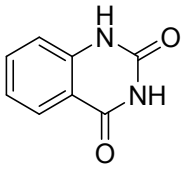


^{13}C NMR (100.6 MHz, DMSO-d_6) **(fresh prepared)**

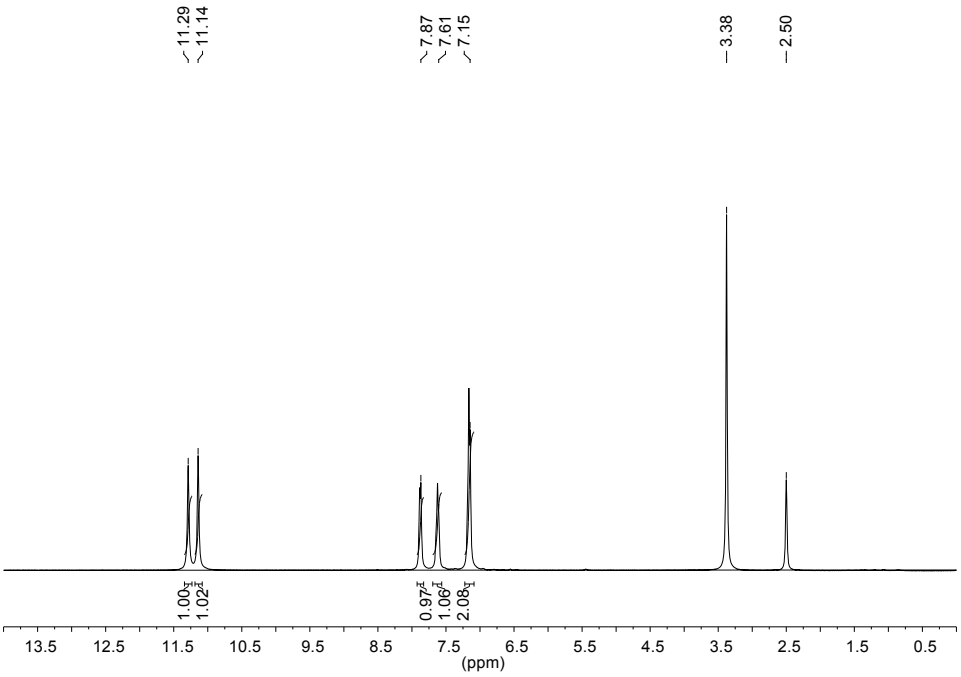


^{31}P NMR (162 MHz, DMSO-d_6) **(fresh one)**

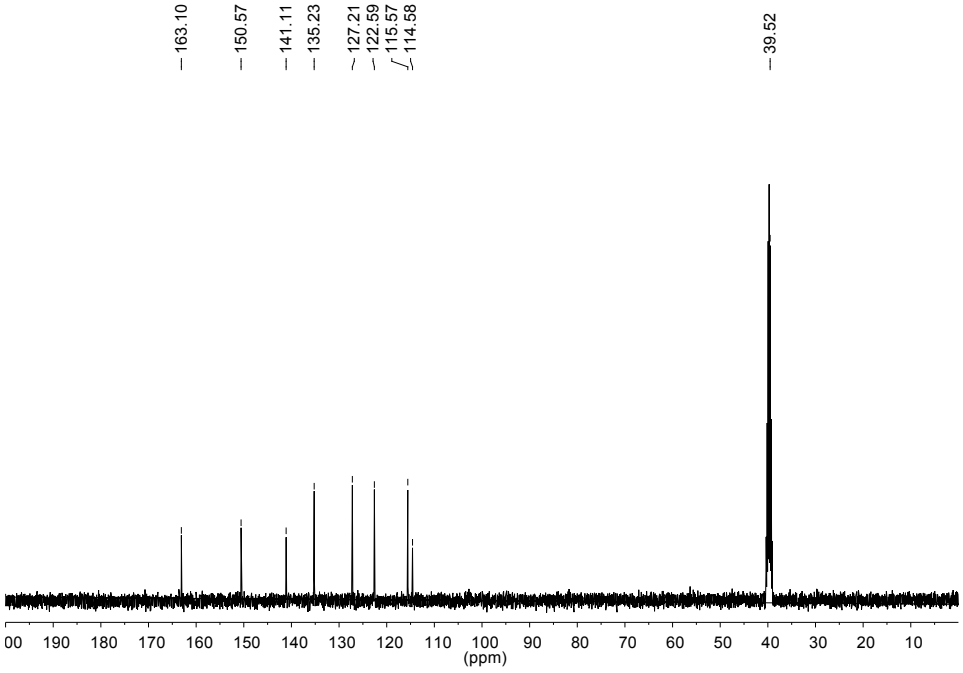


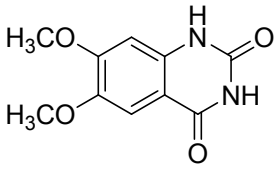


2a ^{1}H NMR (400 MHz, DMSO-d_6)

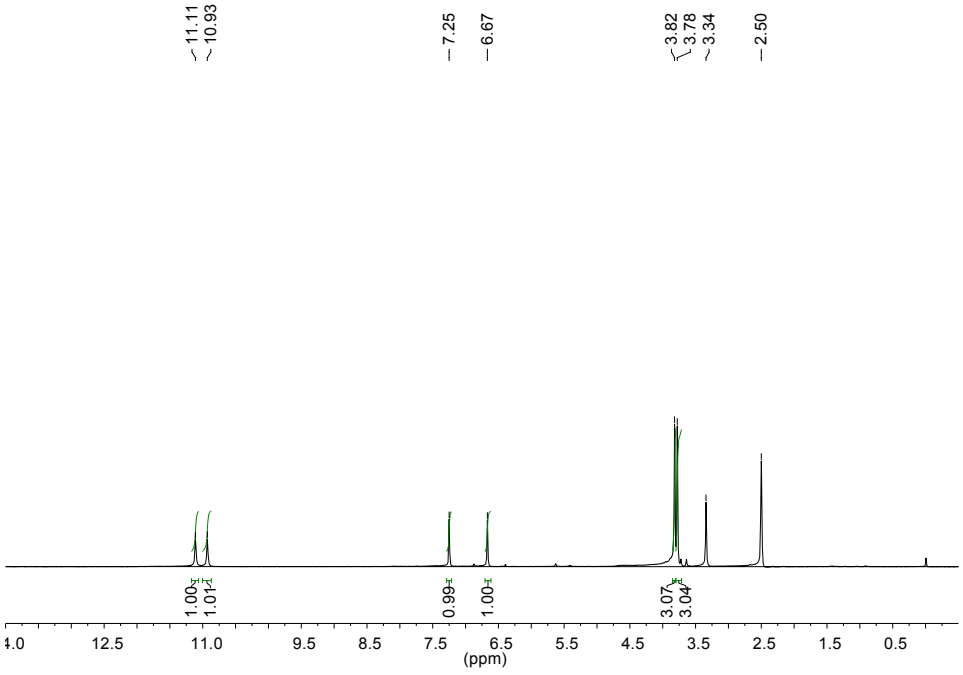


2a ^{13}C NMR (100.6 MHz, DMSO-d_6)

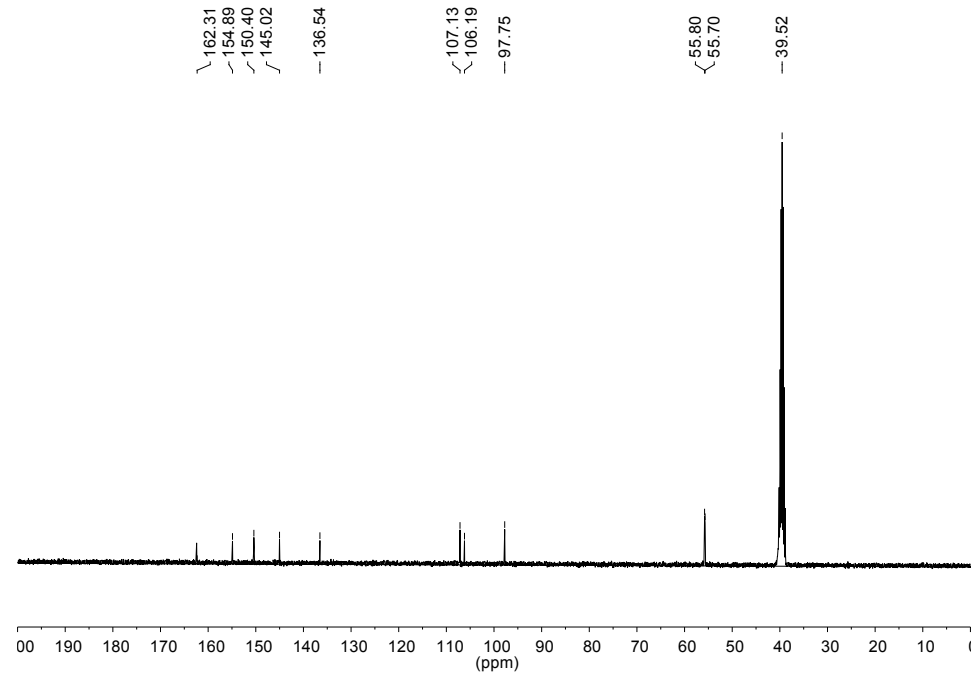


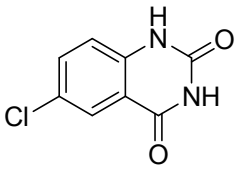


2b ^{1}H NMR (400 MHz, DMSO-d_6)

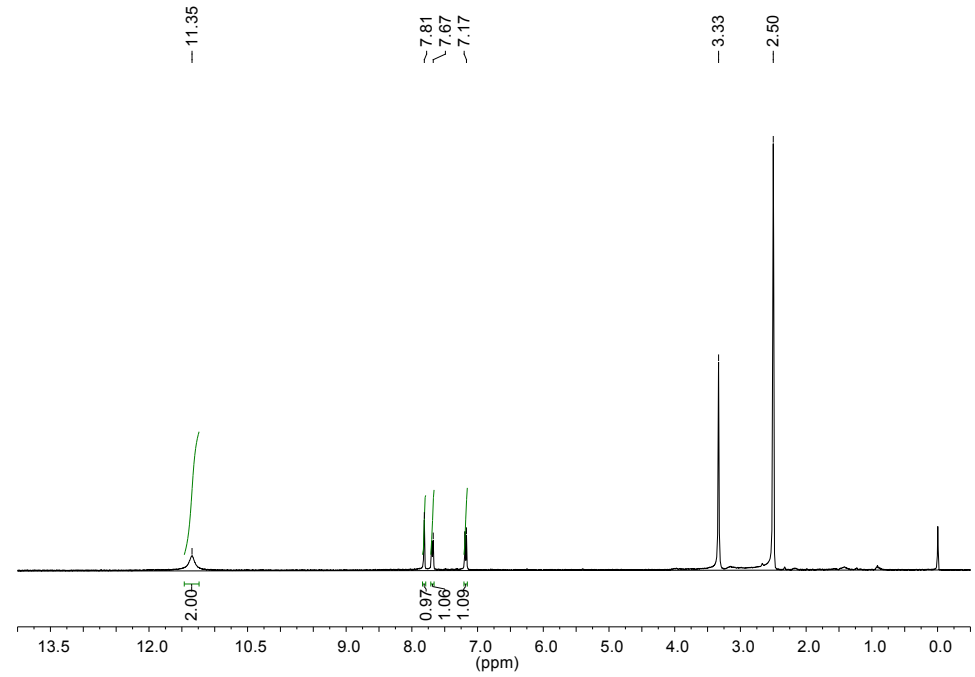


2b ^{13}C NMR (100.6 MHz, DMSO-d_6)

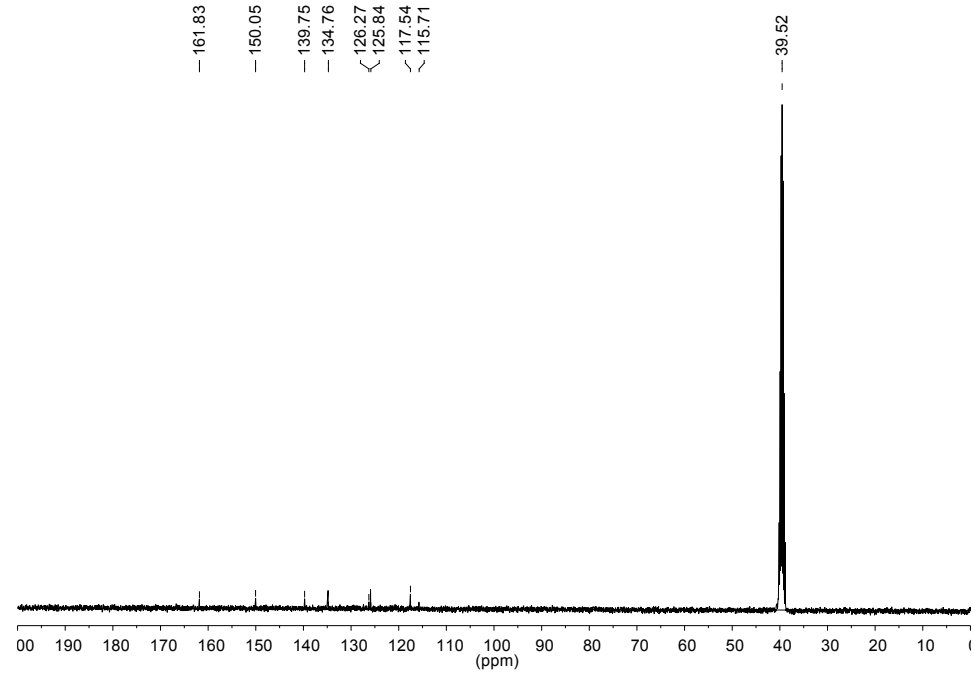


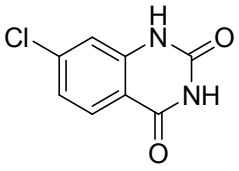


2c ^{1}H NMR (400 MHz, DMSO-d_6)

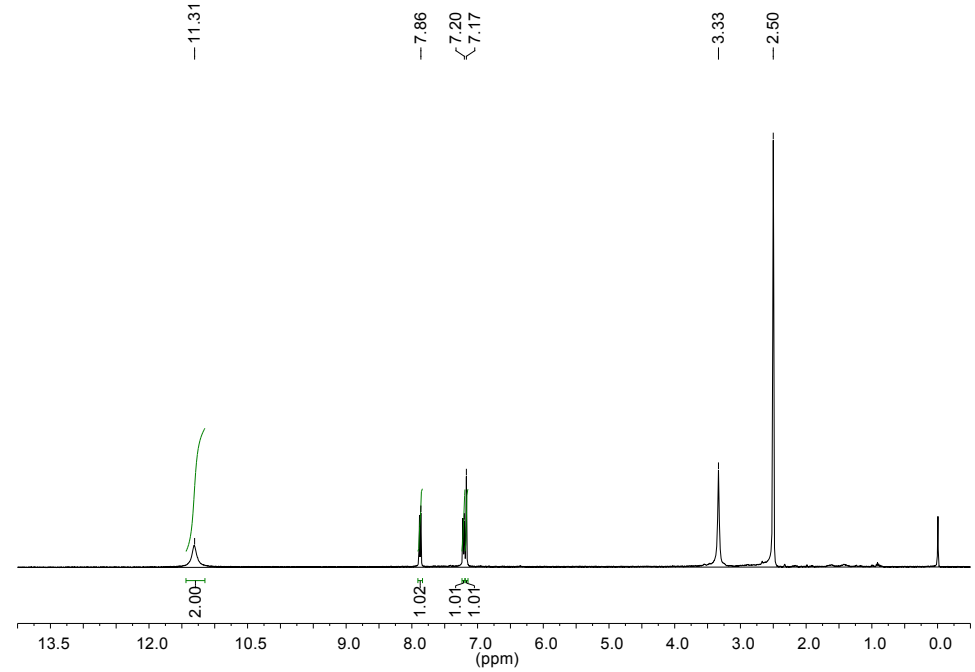


2c ^{13}C NMR (100.6 MHz, DMSO-d_6)

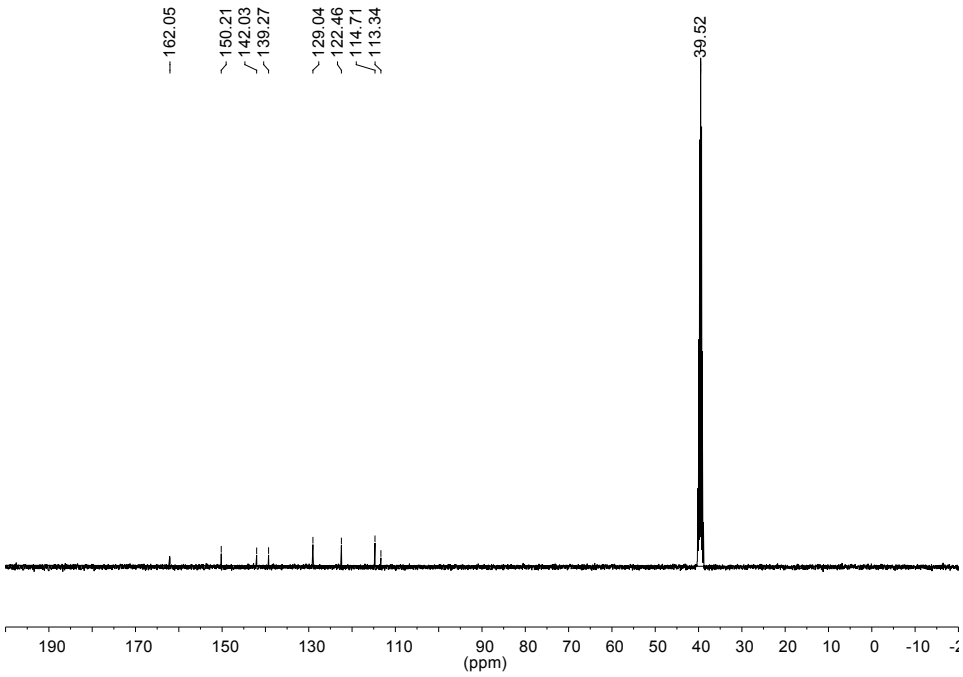


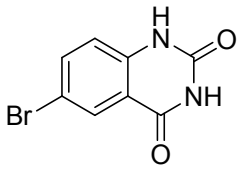


2d ^{1}H NMR (400 MHz, DMSO-d_6)

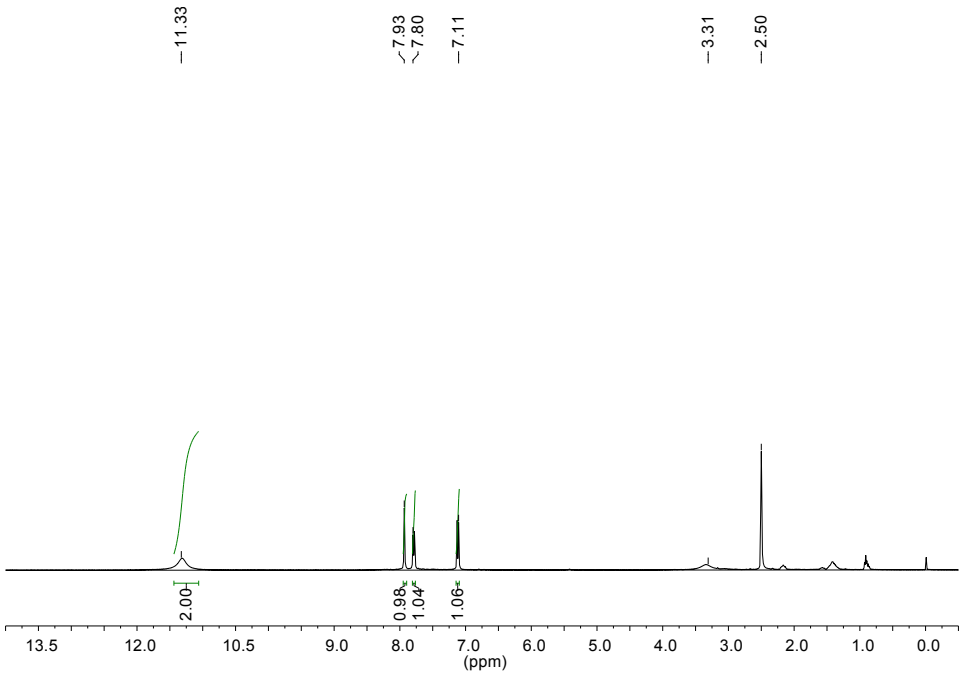


2d ^{13}C NMR (100.6 MHz, DMSO-d_6)

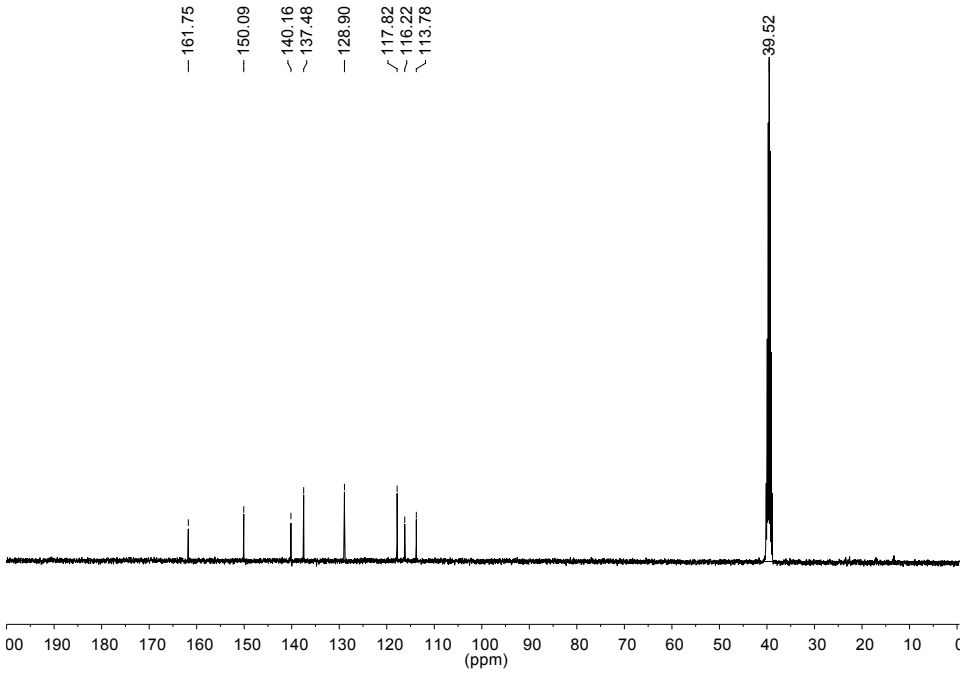


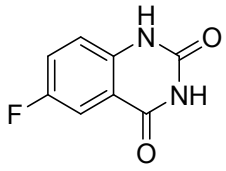


2e ^{1}H NMR (400 MHz, DMSO-d_6)

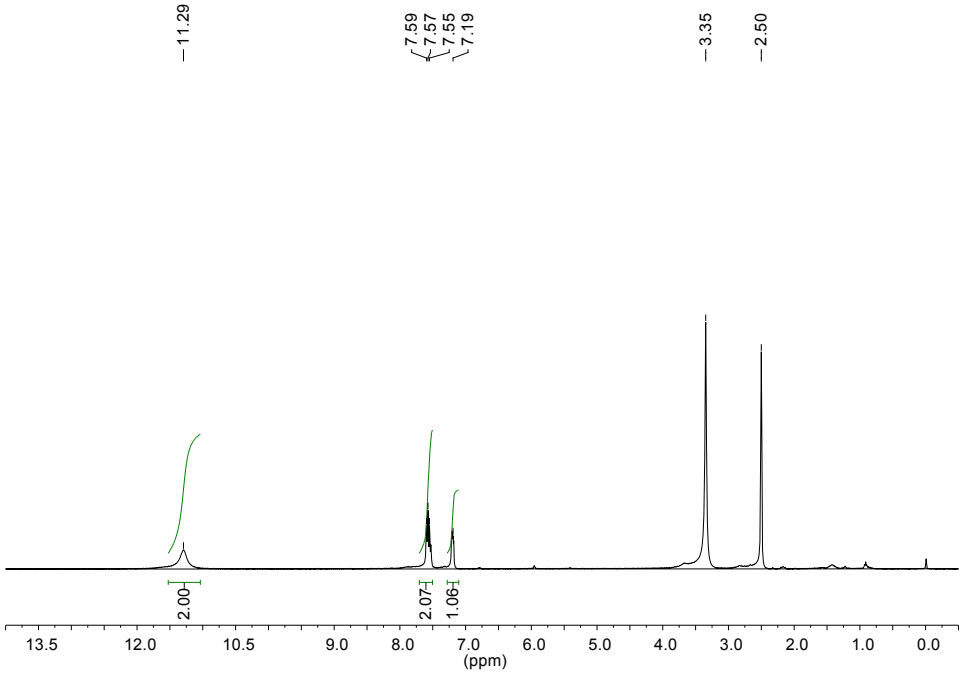


2e ^{13}C NMR (100.6 MHz, DMSO-d_6)

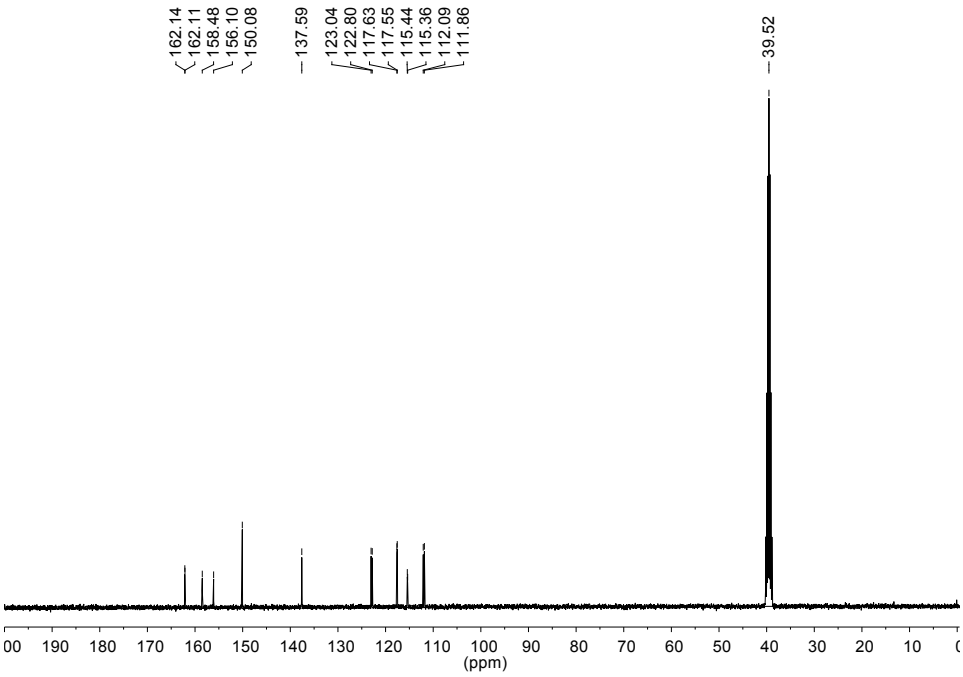


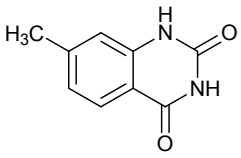


2f ^{1}H NMR (400 MHz, DMSO-d_6)

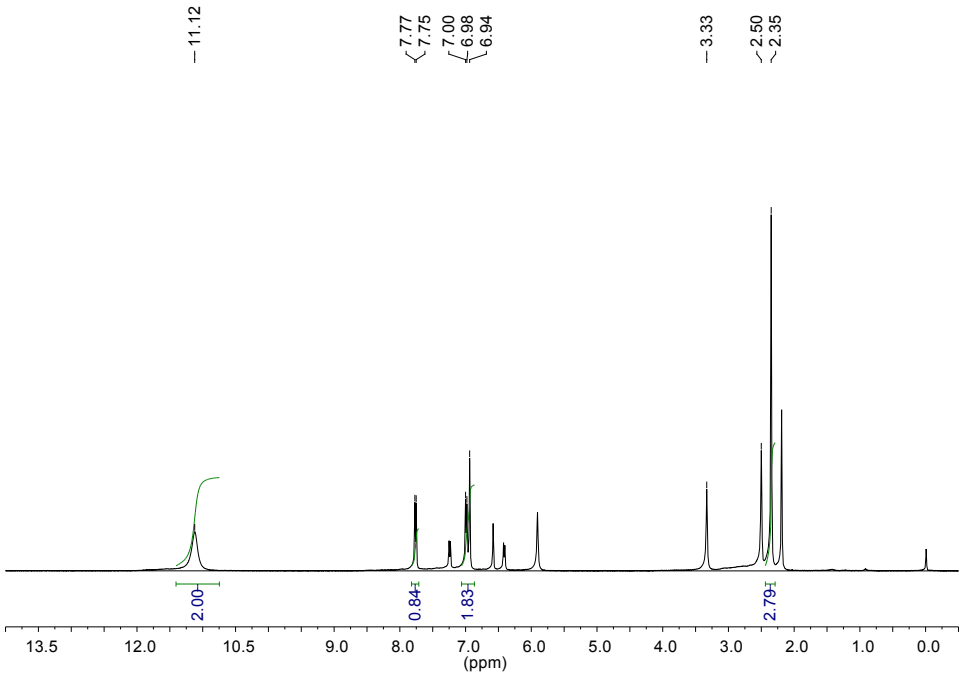


2f ^{13}C NMR (100.6 MHz, DMSO-d_6)

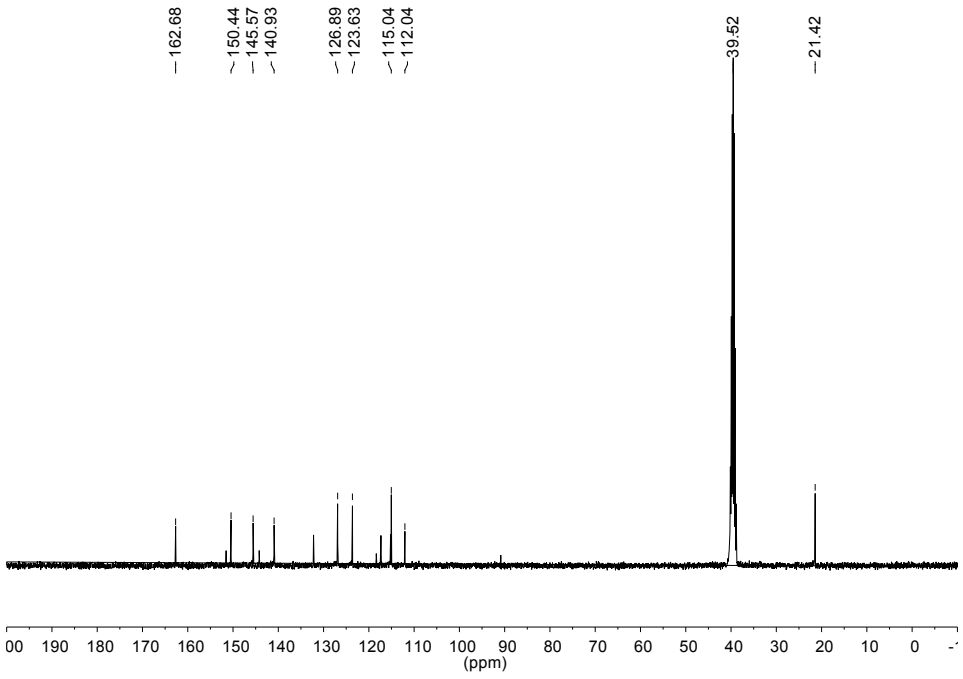




2g ^{1}H NMR (400 MHz, DMSO-d_6)

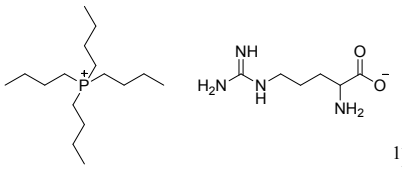


2g ^{13}C NMR (100.6 MHz, DMSO-d_6)

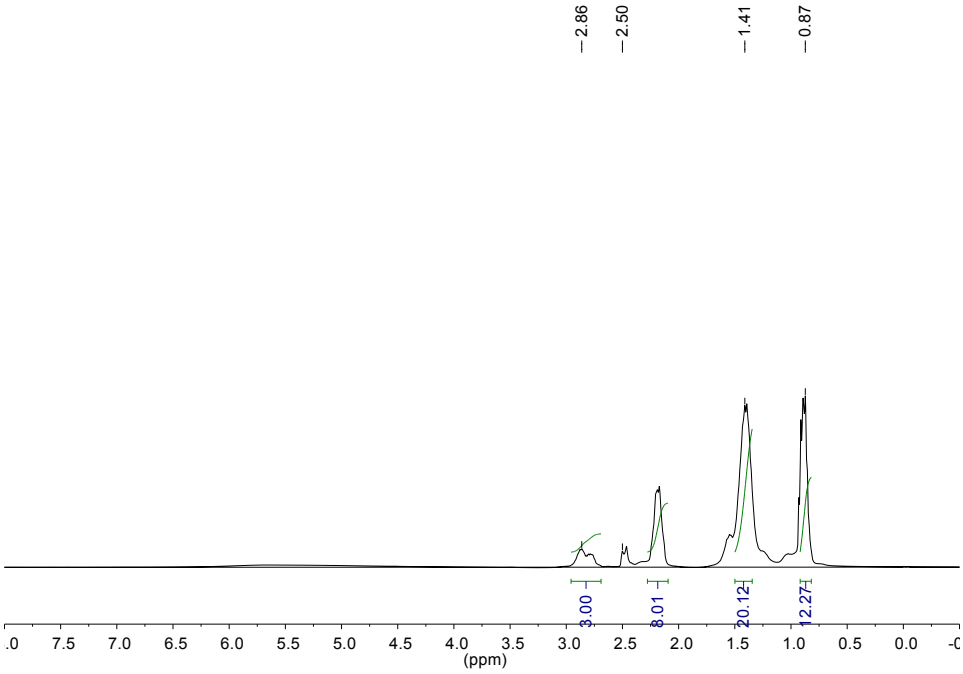


2. General procedure for catalyst recovery and NMR Charts for the recovered catalyst.

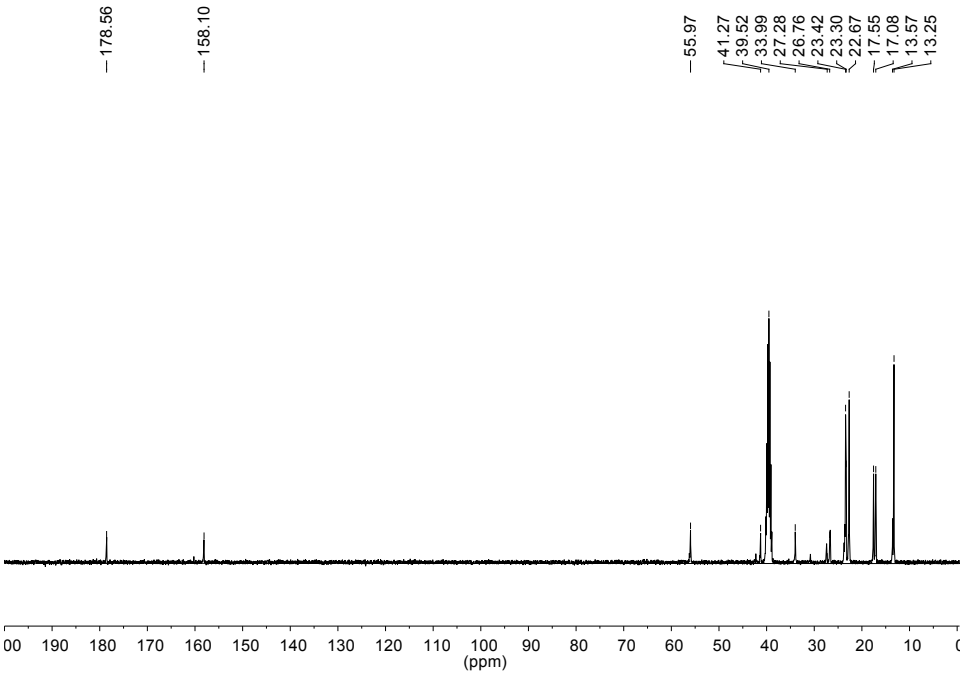
After accomplishment of the reaction, the autoclave was placed in an ice bath to allow it cooled and the inner gas was vented slowly. Water with a volume of 20 mL was poured into the mixture. The resulting precipitate was filtered and washed with water (3×20 mL) and t-BuOMe (3×20 ml), respectively. The water layer was recovered. Then the water was removed by evaporation at 50 ^{o}C and dried in vacuo for 1 day at 70 ^{o}C to give the recovered ionic liquid [TBP][Arg]. ^{1}H NMR and ^{13}C NMR spectra showed that the structure of the IL was not changed after reused for five times.



^{1}H NMR (400 MHz, DMSO-d_6) **(recovered after five cycles)**



^{13}C NMR (100.6 MHz, DMSO-d_6) **(recovered after five cycles)**



^{31}P NMR (162 MHz, DMSO-d_6) **(recovered catalyst)**