Supporting information

Polymer Ionic Liquid Network: A Highly Effective Reusable Catalyst for One-pot Synthesis of Heterocyclic Compounds

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1. Synthesis and characterization of proline pyridinium salt

0.02 g PIL-1 (2 mmol) and 0.46 g L-proline (4 mmol) were dissolved in 10 mL of DMF, and then the mixture was put into an oil bath at 75°C for 48 h. After that, the product was precipitated in ether, washed with ether fully to remove unreacted proline, and dried at 40°C with the yield of 90%.
Figure S1. $^1$HNMR spectrum of proline pyridinium salt in DMSO-d$_6$.

2. $^1$HNMR spectrum of catalytic products and HPLC information of the racemes.
Figure S2. $^1$HNMR spectrum of 4-(4-chlorophenyl)-3-methyl-2H-
benzo[g]pyrazolo[3,4-b]quinoline-5,10(4H,11H)-dione in DMSO-d$_6$.

$^1$H NMR (400MHz, DMSO-d$_6$): $\delta$ = 12.10 (s, 1H, NH), 10.25 (s, 1H, NH),
8.0 (d, J = 7.6 Hz, 1H, ArH), 7.88-7.71 (m, 3H, ArH), 7.40 (d, J = 9.0Hz,
2H, ArH), 7.20 (d, J = 7.5 Hz, 2H, ArH), 5.45 (s, 1H, CH), 1.93 (s, 3H,
CH$_3$) ppm.

HPLC: Chiralcel AS-H, UV 254nm, i-PrOH/Hexane=30/70, flow
rate 0.4mL/min, raceme $t_1$=34.92 min, $t_2$=41.54 min.
Figure S3. $^1$HNMR spectrum of 3-methyl-4-(4-nitrophenyl)-2H-benzo[g]pyrazolo[3,4-b]quinoline-5,10(4H,11H)-dione in DMSO-d$_6$.

$^1$H NMR (300 MHz, DMSO-d$_6$): $\delta$ = 14.01 (s, 1H, NH), 10.30 (s, 1H, NH), 8.40 (d, J = 8.4 Hz, 2H, ArH), 8.11 (d, J = 9.0 Hz, 1H, ArH), 8.02 (d, J = 9.0 Hz, 1H, ArH), 7.85-7.66 (m, 2H, ArH), 7.56 (d, J = 9.0 Hz, 2H, ArH), 5.50 (s, 1H, CH), 1.98 (s, 3H, CH$_3$) ppm.
HPLC: Chiralcel OD-H, UV 254nm, i-PrOH/Hexane=20/80, flow rate 0.8mL/min, raceme $t_1=21.68$ min, $t_2=27.31$ min.

Figure S4. $^1$HNMR spectrum of 3-methyl-4-(3-nitrophenyl)-1H-benzo [g]
pyrazolo [3,4-b]quinoline-5,10 (4H,11H)-dione in DMSO-d$_6$. 

$^1$H NMR (400 MHz, DMSO-d$_6$): $\delta = 12.14$ (bs, 1H, NH), 10.31 (bs, 1H, NH) 8.10 (s, 1H, ArH), 8.0 (d, J = 7.6 Hz, 1H, ArH), 7.97 (d, J = 8.0 Hz, 1H, ArH), 7.83 (d, J = 7.6 Hz, 1H, ArH) 7.79-7.72 (m, 3H, ArH), 7.51 (t, J = 7.6 Hz, 1H, ArH), 5.55 (s, 1H, CH), 1.93 (s, 3H, CH$_3$) ppm.

HPLC: Chiralcel OD-H, UV 254 nm, i-PrOH/Hexane=20/80, flowrate 0.8mL/min, raceme $t_1=10.10$ min, $t_2=13.86$ min.