Supplementary Information

Direct Conversion of Chitin into a *N*-containing Furan Derivative

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Content

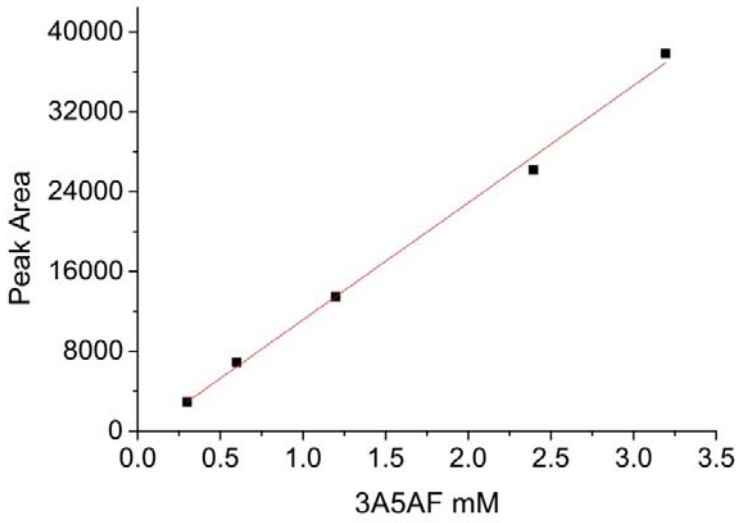


Figure S1 Calibration curve of 3A5AF on HPLC (230 nm, $R^2 = 0.995$)

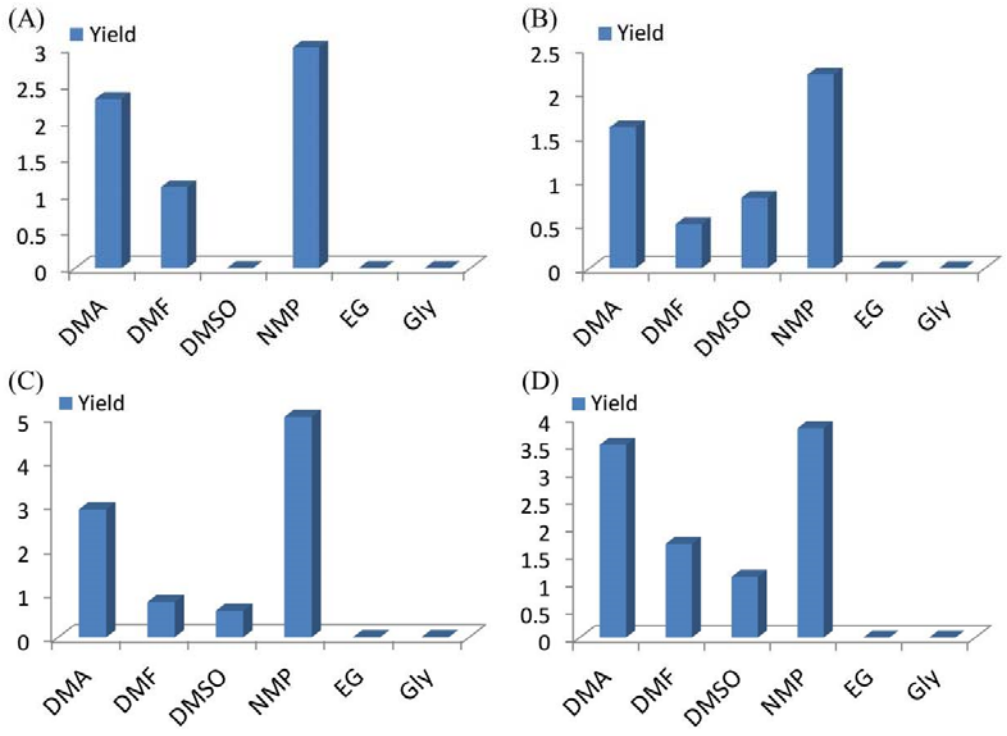


Figure S2 Solvent screening experiments on chitin to 3A5AF. Reaction conditions: 195˚C, 1h, solvent (3 mL), chitin (100 mg). (A) 80 µL HCl (fumed); (B) 400 mol% boric acid; (C) 5 wt% in solvent LiCl, 400 mol% boric acid; (D) 80 µL HCl (fumed), 400 mol% boric acid.

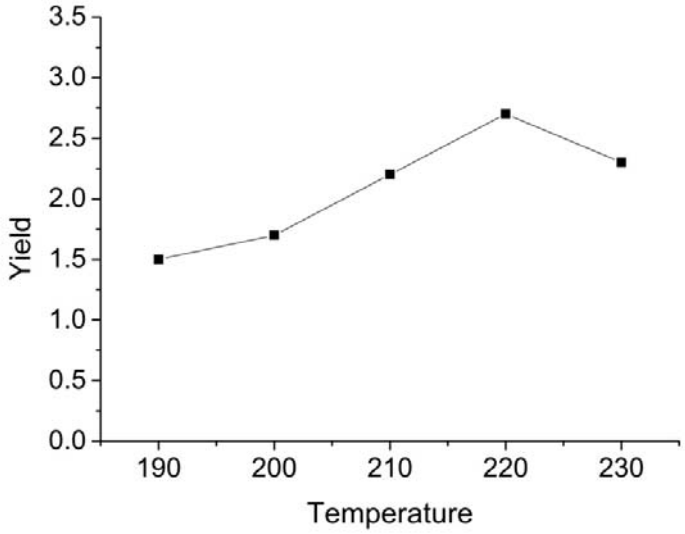


Figure S3 Optimization of reaction temperature. Reaction conditions: 1 h, NMP (3 mL), chitin (100 mg), boric acid (400 mol%).

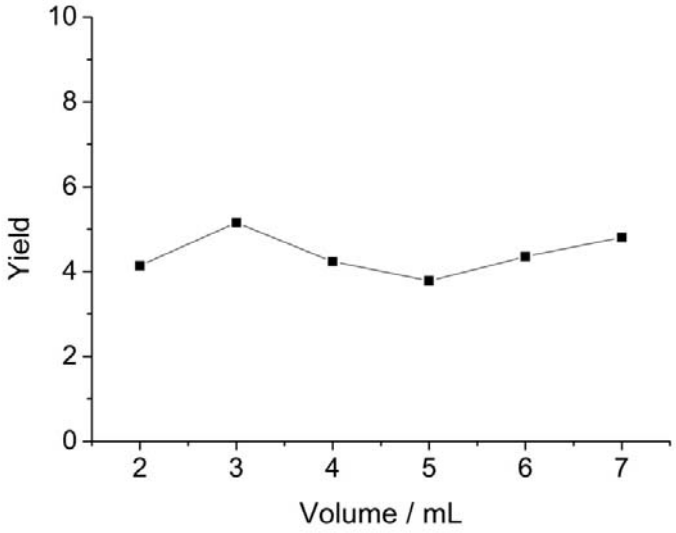


Figure S4 Optimization of solvent amounts. Reaction conditions: 195 ˚C, 1 h, chitin (100 mg), boric acid (400 mol%), LiCl (5 wt% in NMP).

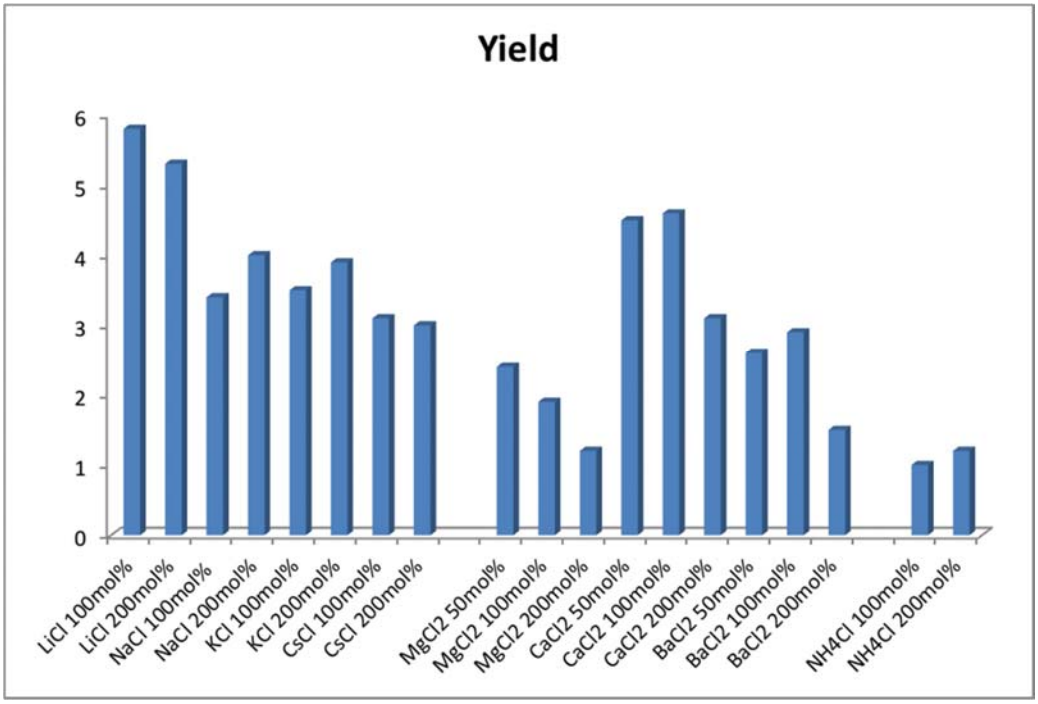


Figure S5 Screening of combined additives (boric acid plus alkali/alkaline earth chlorides). Reaction conditions: 215 ˚C, 1 h, chitin (100 mg), boric acid (400 mol%).

Table S1 Elemental analysis of chitin, recovered chitin after reaction and chitin-humins

Entry	C wt%	H wt%	N wt%
Chitin before reaction	47.24	6.40	6.89
Chitin after reaction	44.15	6.62	6.13
Chitin-humins	54.88	5.39	8.05

Reaction conditions: 215 ˚C, 1 h, NMP (3 mL), chitin (100 mg), boric acid (400 mol%), NaCl (200 mol%).

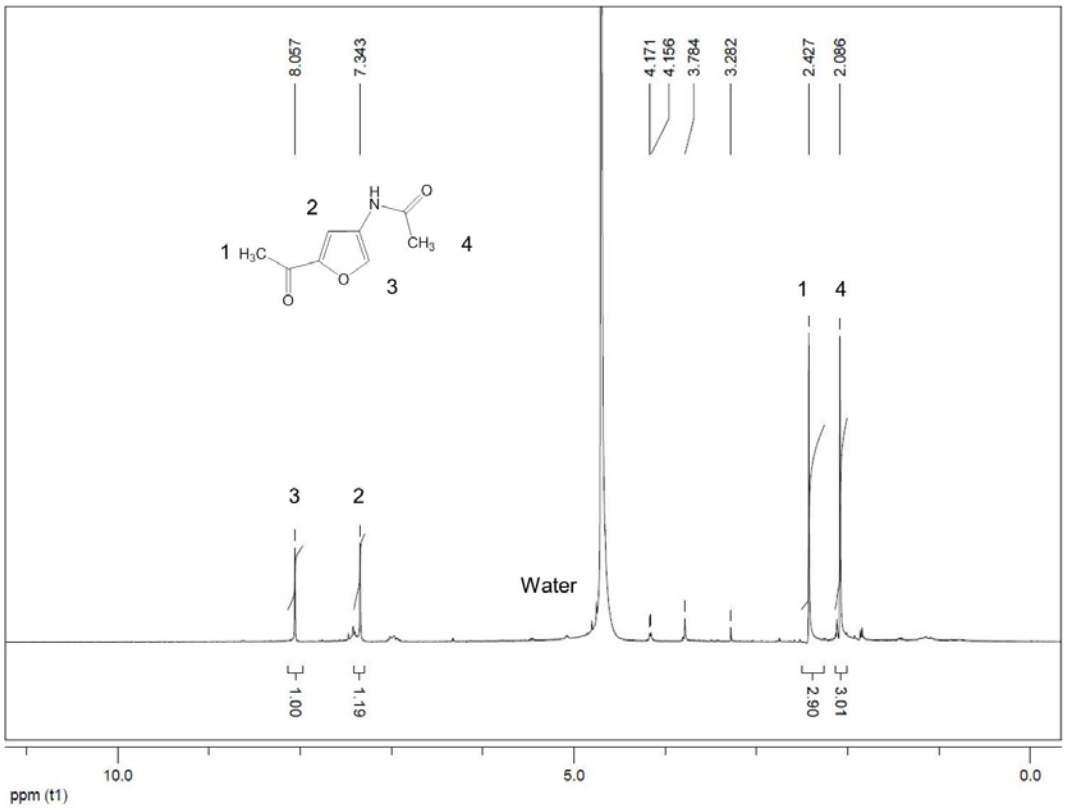


Figure S6 ^{1}H NMR of 3A5AF (400 MHz, D_2O) δ 8.06 (1H), 7.34 (1H), 2.43 (3H), 2.09 (3H)

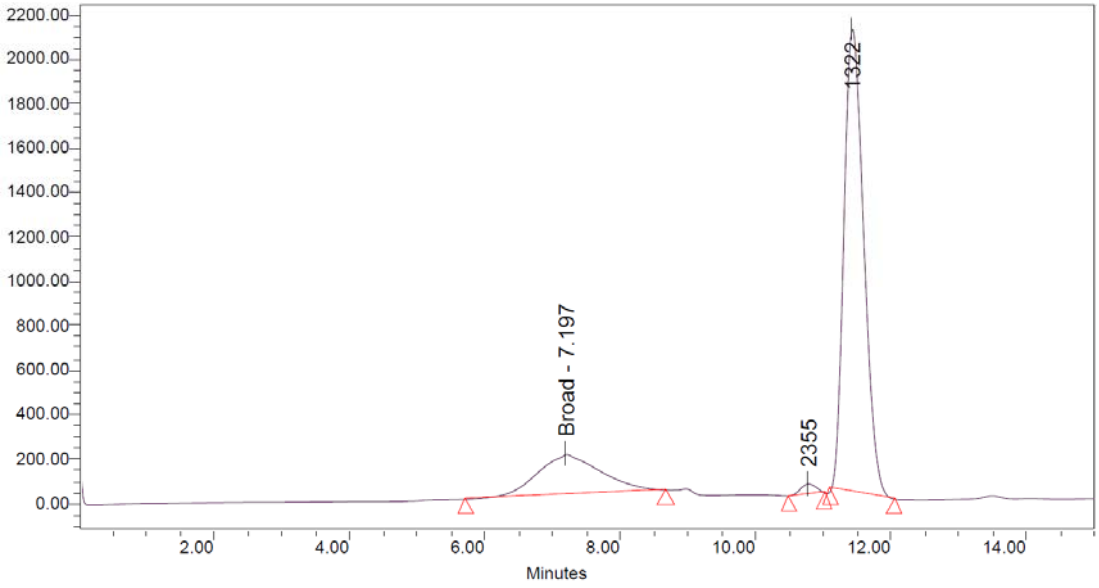


Figure S7 GPC analysis of chitin-humins fraction after column separation. Reaction conditions: 215 ˚C, 1 h, NMP (3 mL), chitin (100 mg), boric acid (400 mol%), NaCl (200 mol%).

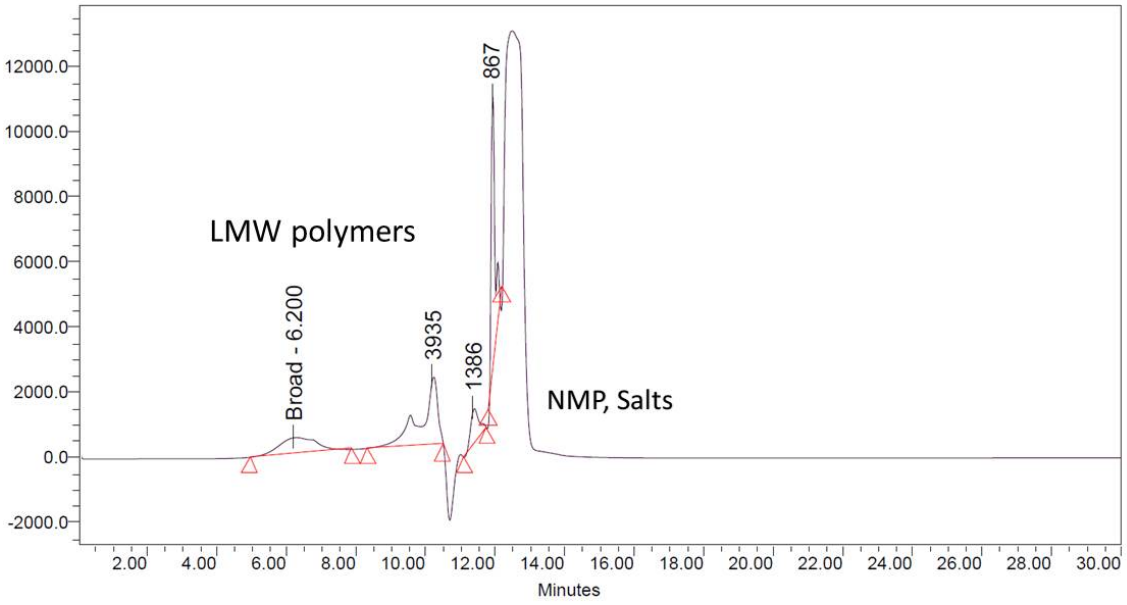
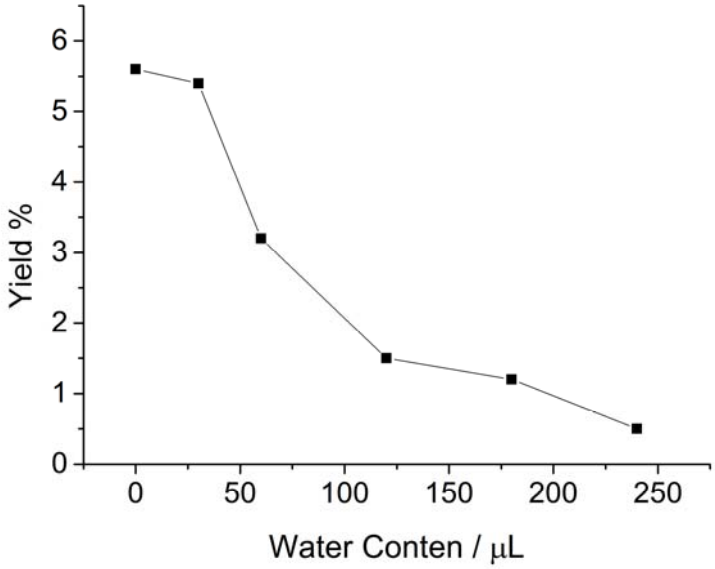


Figure S8 GPC analysis of the raw filtrate after reaction. Reaction conditions: 215 ˚C, 1 h, NMP (3 mL), chitin (100 mg), boric acid (400 mol%), NaCl (200 mol%).



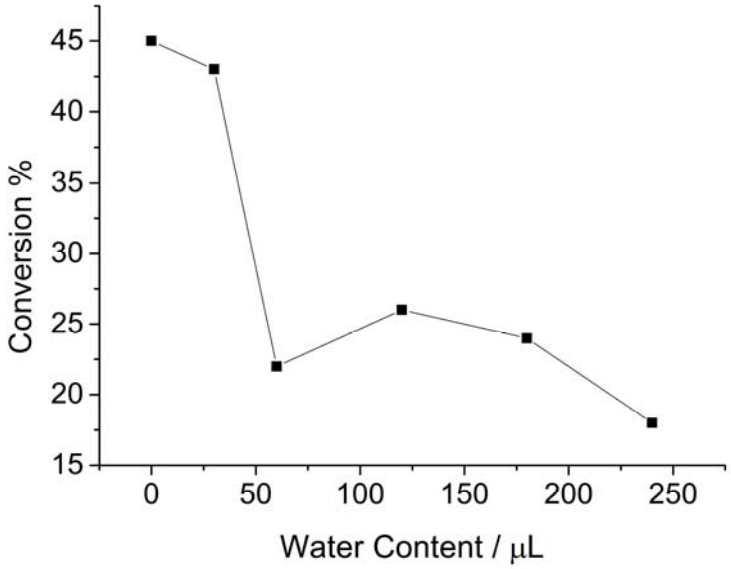


Figure S9 The influence of water on the reaction. Reaction conditions: 215 ˚C, 1 h, NMP (3 mL), chitin (100 mg), boric acid (400 mol%), NaCl (200 mol%).

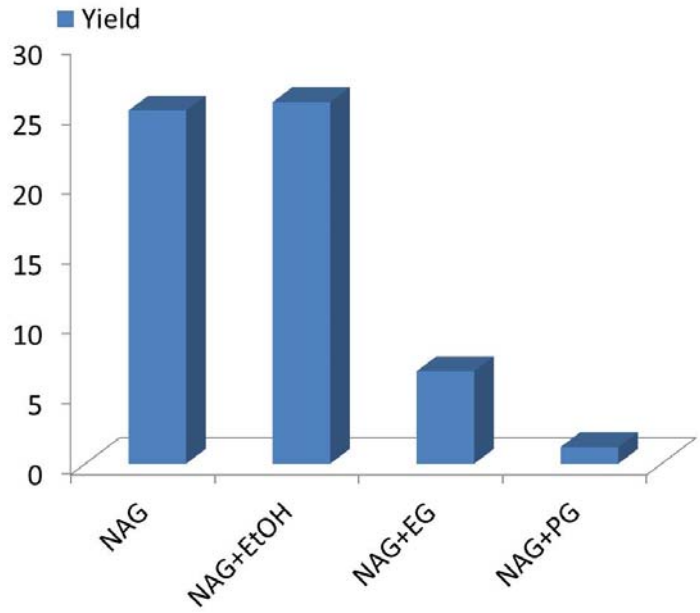


Figure S10 Poison tests for NAG conversion to 3A5AF. Reaction conditions: 215 ˚C, 1 h, NMP (3 mL), chitin (100 mg), boric acid (400 mol%), NaCl (200 mol%).

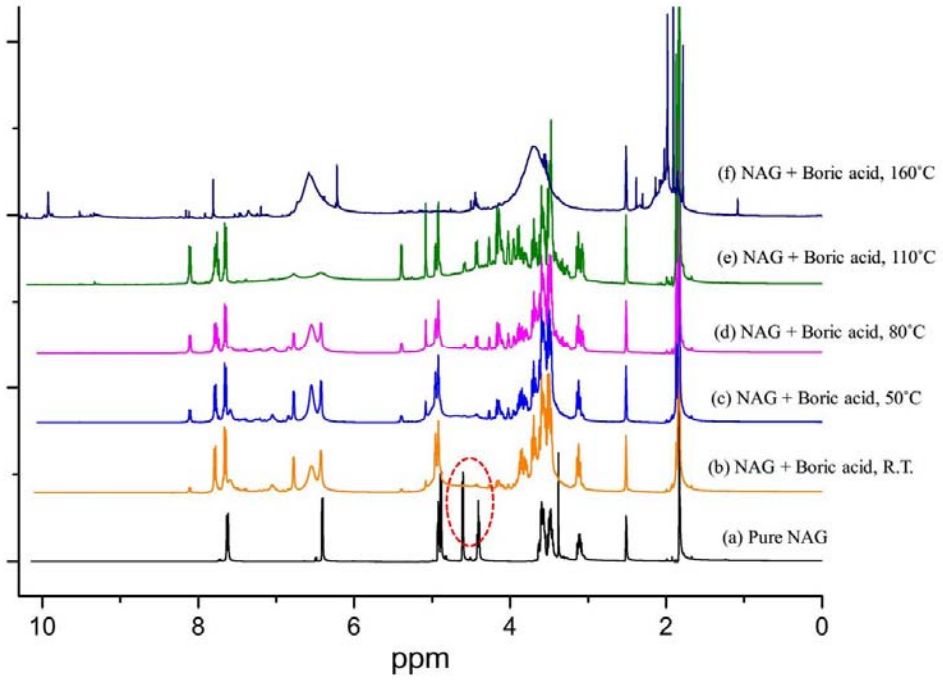


Figure S11 ^{1}H NMR (DMSO-d_6) spectra of pure NAG and NAG-boric acid at different temperatures. Note: upon the addition of boric acid, two peaks disappear which are labeled with a red ellipse. The broadening of peaks is probably due to the interaction with boric acid.