Supplementary Information

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

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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

<table>
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<tr>
<th>Entry</th>
<th>C wt%</th>
<th>H wt%</th>
<th>N wt%</th>
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<tr>
<td>Chitin before reaction</td>
<td>47.24</td>
<td>6.40</td>
<td>6.89</td>
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<td>Chitin after reaction</td>
<td>44.15</td>
<td>6.62</td>
<td>6.13</td>
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<tr>
<td>Chitin-humins</td>
<td>54.88</td>
<td>5.39</td>
<td>8.05</td>
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</table>

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$_2$O) $\delta$ 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.