

## Supporting Information

### One-Pot Synthesis of $\gamma,\delta$ -Unsaturated Carbonyl Compounds from Allyl Alcohols and Vinyl or Isopropenyl Acetates Catalyzed by $[\text{IrCl}(\text{cod})]_2$

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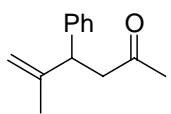
S7: Copies of  $^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of **4cb** (**4db**)

5-Methyl-4-phenyl-5-hexen-2-one (**4aa**)  $^1\text{H}$  NMR  $\delta$  1.61 (s, 3H), 2.06 (s, 3H), 2.77-3.01 (m, 2H), 3.81 (t,  $J=7.50$  Hz, 1H), 4.85 (d,  $J=6.43$  Hz, 2H), 7.16-7.30 (m, 5H);  $^{13}\text{C}$  NMR  $\delta$  207.0, 146.7, 142.1, 128.2, 127.5, 126.4, 110.0, 48.0, 47.5, 23.5, 21.8; IR (NaCl) 2360, 2341, 1717, 700  $\text{cm}^{-1}$

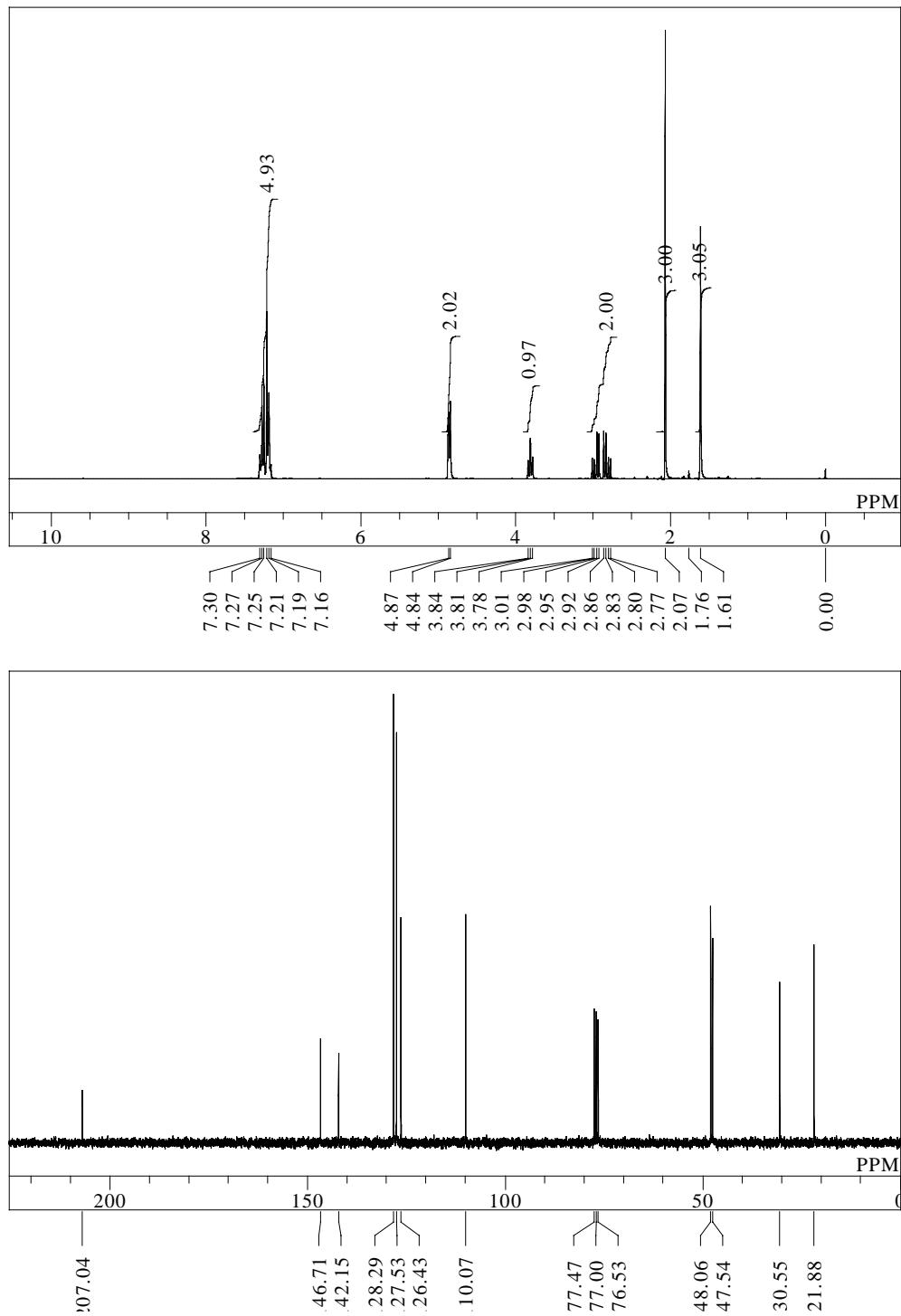
4-Methyl-3-phenyl-4-pentenal (**4ab**)  $^1\text{H}$  NMR  $\delta$  1.61 (s, 3H), 2.76-2.95 (m, 2H), 3.84 (t,  $J=7.80$  Hz, 1H), 4.90 (d,  $J=12.1$  Hz, 2H), 7.19-7.31 (m, 5H), 9.68 (s, 1H);  $^{13}\text{C}$  NMR  $\delta$  201.4, 146.2, 141.6, 128.5, 127.6, 126.8, 111.1, 47.5, 46.5, 21.4; IR (NaCl) 3427, 2971, 2938, 1724, 1452, 1100, 700  $\text{cm}^{-1}$

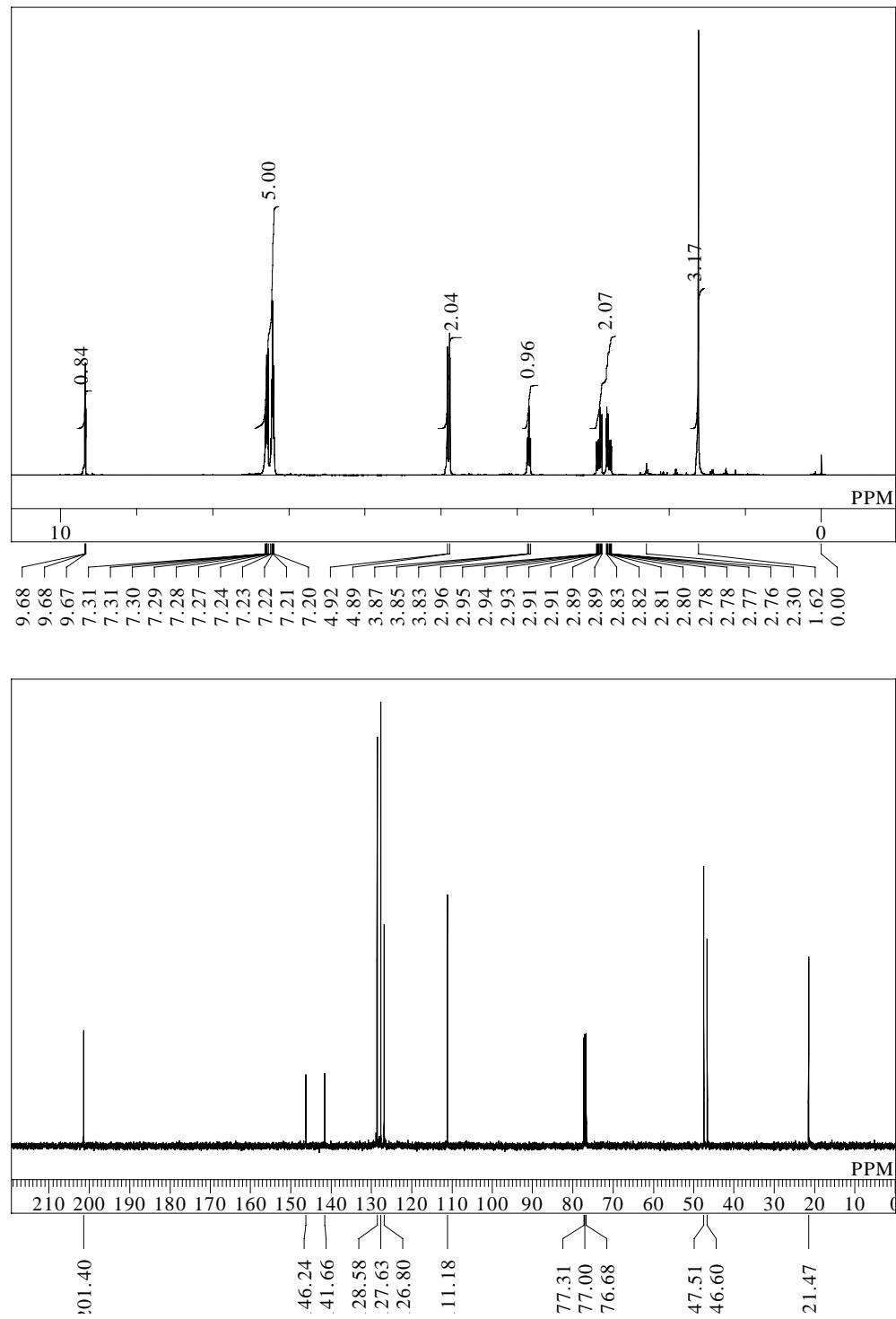
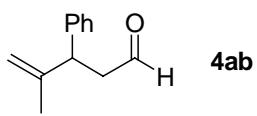
4-Ethenyl-4,8-dimethyl-7-non-en-2-one (**4ca** (**4da**))  $^1\text{H}$  NMR  $\delta$  1.11 (s, 3H), 1.39-1.47 (m, 2H), 1.58 (s, 3H), 1.67 (s, 3H), 1.87-1.89 (m, 2H), 2.10 (s, 3H), 2.44 (q,  $J=18.0$  Hz, 2H), 4.92-5.07 (m, 3H), 5.83 (dd,  $J=10.7, 17.5$  Hz, 1H);  $^{13}\text{C}$  NMR  $\delta$  208.1, 145.8, 131.4, 124.4, 112.2, 61.3, 53.5, 40.8, 39.4, 32.3, 25.6, 22.8, 17.5; IR (NaCl) 3086, 2971, 2922, 1728, 1358, 910  $\text{cm}^{-1}$

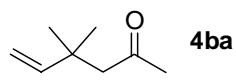
3-Ethenyl-3,7-dimethyl-6-octenal (**4cb** (**4db**))  $^1\text{H}$  NMR  $\delta$  1.15 (s, 3H), 1.39-1.44 (m, 2H), 1.58 (s, 3H), 1.66 (s, 3H), 1.88-1.94 (m, 2H), 2.29-2.41 (m, 2H), 4.98-5.12 (m, 3H), 5.84 (dd,  $J=10.7, 17.5$  Hz, 1H), 9.72 (s, 1H);  $^{13}\text{C}$  NMR  $\delta$  203.2, 144.9, 131.7, 124.0, 113.1, 53.0, 41.4, 38.9, 25.6, 23.4, 22.5, 17.5; IR (NaCl) 3089, 2969, 2925, 1734, 1457, 1416, 1375, 917  $\text{cm}^{-1}$



**4aa**







**4ba**

