

electronically to a π -allyliron cation, which is likely to be more stable and presumably serves as the actual intermediate reacting with nucleophiles. In the case of *trans*-**1** the π -allyliron cation can be formed directly.

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Footnotes

† Selected data for **3**: IR ν/cm^{-1} (CHCl_3): 1735, 1680; ^1H NMR (CDCl_3 ; J/Hz): δ 1.16 (t, 3 H, J 7.0, OCH_2CH_3), 1.93 (d, 3 H, J 5.4, $=\text{CH}-\text{CH}_3$), 2.06 (m, 2 H, 4-H), 2.45 (ddd, 1 H, J 4.0, 6.3, 18.1, 3-H), 2.88 (dt, 1 H, J 10.1, 17.6, 3-H), 3.63 (q, 2 H, J 7.0, OCH_2), 5.75 (dd, 1 H, J 1.5, 3.4, 5-H), 7.03–7.18 (m, 2 H, $-\text{CH}=\text{CH}-$); ^{13}C NMR (CDCl_3): δ 15.0, 18.2, 26.0, 31.4, 64.7, 86.2, 123.5, 146.0, 165.6, 175.4.

‡ Selected data for **5**: IR ν/cm^{-1} (pentane): 2100, 2020, 1990, 1735, 1670; ^1H NMR (C_6D_6 ; J/Hz): δ 1.03 (m, 3 H, OCH_2CH_3), 1.18–1.48 (m, 5 H, $=\text{CH}-\text{CH}_3$ and 4-H), 2.00 (dt, 1 H, J 8.4, 17.4, 3-H), 2.65 (m, 1 H, 3-H), 3.45 (m, 2 H, OCH_2), 4.08 (m, 1 H, β -H), 4.68 and 4.82 (d, 1 H, J 11.1, α -H), 5.40 and 5.52 (d, 1 H, J 4.6, 5-H); ^{13}C NMR (C_6D_6): δ 16.1, 24.1, 26.5/27.1, 32.4/32.5, 55.1/55.5, 56.9/57.9, 65.6/65.8, 87.4/87.5, 172.2/173.5, 175.5/175.8, 209.9.

§ Selected data for **7**: IR ν/cm^{-1} (CHCl_3): 1730, 1670; ^1H NMR (CDCl_3 ; J/Hz): δ 1.80–2.76 (m, 6 H), 1.91 (d, 3 H, J 5.7, $=\text{CHCH}_3$), 4.45 (m, 1 H, 5-H), 5.09 (dd, 2 H, J 0.8, 12.6, $=\text{CH}_2$), 5.74 (m, 1 H, $=\text{CH}-$), 6.99–7.18 (m, 2 H, $-\text{CH}=\text{CH}-$); ^{13}C NMR (CDCl_3): δ 18.2, 21.4, 32.1, 37.0, 56.2, 118.5, 123.8, 133.0, 145.3, 165.6, 175.5.

¶ From an experiment with **3** in the presence of Ac_2O , 5-acetoxy-1-crotonyl-2-pyrrolidinone was isolated, indicating the BF_3 -mediated formation of 5-acetoxy compounds from 5-ethoxypyrrolidinones and acetic anhydride.

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