



electron-withdrawing groups like malonates and  $\beta$ -ketoesters.

We think that the new synthetic method can be used in the preparation of  $^{10}\text{B}$  carriers for neutron capture therapy. Work on this is in progress.

### 1. Experimental details

The solution of 10 mg  $\text{Pd}(\text{dba})_2$ , 6.6 mg dppe, 1 mmol **1a** or **1b**, and 2 mmol of **2a** or **2b** in 3 ml of dry THF was stirred for 2–5 h (TLC controlled). Ether (10 ml) and water (10 ml) were added, the organic layer separated and the aqueous layer extracted with three portions of ether (5 ml), dried ( $\text{MgSO}_4$ ), and concentrated. The resulting product was crystallized.

All new compounds were fully characterized by spectroscopic methods ( $^1\text{H}$  NMR, IR, MS) and their molecular formulas established by microanalyses. M.p.,  $^1\text{H}$  NMR, IR-data, and mass spectra of the products are as follows:

**3a**. M.p.: 78–79°C. MS:  $m/e$  346. IR (KBr): 1734  $\text{cm}^{-1}$  (C=O), 2580–2590  $\text{cm}^{-1}$  (B–H).  $^1\text{H}$ -NMR (200 MHz) ( $\text{CDCl}_3$ ):  $\delta$  1.50 (s, 1H), 2.08 (s, 3H), 2.60–3.12 (m, 2H), 3.65 (s, 3H), 5.67–5.97 (m, 1H), 6.39–6.47 (d, 1H), 7.19–7.30 (m, 5H).

**3b**. M.p.: 51°C. MS:  $m/e$  332. IR (KBr): 1750  $\text{cm}^{-1}$  (C=O), 2580–2590  $\text{cm}^{-1}$  (B–H).  $^1\text{H}$ -NMR (200 MHz)

( $\text{CDCl}_3$ ):  $\delta$  1.56 (s, 1H), 2.10–2.64 (m, 2H), 3.63 (s, 3H), 4.78–4.91 (m, 2H), 5.21–5.34 (m, 1H), 7.37–7.68 (m, 5H).

**3c**. M.p.: 130–131°C. MS:  $m/e$  409. IR (KBr): 1744  $\text{cm}^{-1}$  (C=O), 2550–2560  $\text{cm}^{-1}$  (B–H).  $^1\text{H}$ -NMR (200 MHz) ( $\text{CDCl}_3$ ):  $\delta$  1.55 (s, 1H), 2.26–2.77 (m, 2H), 3.59 (s, 3H), 5.54–5.69 (m, 1H), 6.10–6.18 (d, 1H), 7.12–7.24 (m, 5H), 7.41–7.68 (m, 5H).

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### References

- 1 L. I. Zakharkin, V. N. Kalinin, A. P. Snyakin and B. A. Kvasov, *J. Organomet. Chem.*, **18** (1969) 19.
- 2 R. N. Grimes, *Carboranes*, Academic Press, New York, 1970.
- 3 V. I. Bregadze, *Chem., Rev.*, **92** (1992) 209.
- 4 L. I. Kryglyak, E. S. Petrov, V. N. Kalinin, L. I. Zakharkin and A. I. Shatenstein, *Zh. Obshch. Khim.*, **42** (1972) 2670.
- 5 J. Tsuji, *Pure Appl. Chem.*, **61** (1989) 1673.
- 6 H. Nemoto, F. G. Rong and Y. Yamamoto, *J. Org. Chem.*, **55** (1990) 6065.