Parallel Carbynylation and Decarbonylative Heck Reaction on Palladium/Carbon

**Significance:** Palladium on carbon (Pd/C) catalyzed the carbonylation of aryl iodides with terephthalaldehyde as a CO source to give the corresponding products in up to 98% yield (eq. 1; 17 examples). A simultaneous parallel decarbonylative Mizoroki–Heck reaction of cinnamaldehydes with iodobenzenes (tube A) and carbonylation of 2-iodobenzyl alcohol or 2-iodobenzamide with the CO generated in situ (tube B) were carried out in the presence of Pd/C in an H-shaped tube to give trans-stilbenes and a phthalide or phthalimide, respectively (eq. 2; 6 examples).

**Comment:** No recyclability of Pd/C was observed in the parallel decarbonylative Mizoroki–Heck reaction of 4-methoxycinnamaldehyde with iodobenzene and carbonylation of 2-iodobenzyl alcohol (first reuse: 4-methoxy-trans-stilbene: 0% yield; phthalide: trace).

**Equations:**

1. Pd/C (10 mol% Pd) Na₂CO₃ (2 equiv) i-PrOH, N₂, 120 °C, 6 h
   
   R₂ = H, 88% yield
   R₂ = Ac, 85% yield
   R₂ = NO₂, 87% yield
   R₂ = OMe, 75% yield

2. ArI (1 equiv) TBAI (2 equiv) NMP, N₂, 120 °C, 18 h
   
   R₂ = n-Bu, 20% yield
   R₂ = n-Pent, 64% yield
   R₂ = Me, 54% yield

Selected results:

- R₂ = H, 88% yield
- R₂ = Ac, 85% yield
- R₂ = NO₂, 87% yield
- R₂ = OMe, 75% yield
- R₂ = n-Bu, 20% yield
- R₂ = n-Pent, 64% yield
- R₂ = Me, 54% yield

**Key words:** carbonylation, Mizoroki–Heck reaction, cinnamaldehydes, palladium on carbon, palladium catalysis