Direct Cross-Coupling of Phenols with Amines Using Palladium on Carbon

**Significance:** Palladium on carbon catalyzed the formal dehydrative direct cross-coupling of phenols with amines in the presence of sodium formate and trifluoroacetic acid in toluene to give the corresponding secondary or tertiary amines in ≤90% yield (33 examples).

**Comment:** When biphenol was used as the substrate, only one C–N bond was formed (3p), whereas two C–N bonds were formed in the reaction of resorcinol (3q). Product 3u, bearing an ester group, was obtained without ester–amine exchange. A nitrogen-containing heterocyclic product 3w was obtained from the reaction of catechol with cyclohexane-1,2-diamine.

**Selected results:**

| 3a | 61% yield |
| 3b | 62% yield |
| 3c | 85% yield |
| 3d | 68% yield |
| 3e | 63% yield |
| 3f | 46% yield (24 h) |
| 3g | 56% yield (24 h) |
| 3h | 74% yield (24 h) |
| 3i | 42% yield |
| 3j | 40% yield (24 h) |
| 3k | 86% yield |
| 3l | 70% yield |
| 3m | 57% yield |
| 3n | 50% yield |
| 3o | 42% yield |
| 3p | 45% yield |
| 3q | 67% yield (2 0.48 mmol) |
| 3r | 90% yield |
| 3s | 71% yield |
| 3t | 68% yield |
| 3u | 82% yield |
| 3v | 83% yield (2 0.48 mmol) |
| (±)-3w | 75% yield |