A Heterogeneous Palladium Catalyst for C2-Selective Arylation of Indoles

**Significance:** Pd\(^0\)-AmP-MCF constitutes of silica-based mesocellular foam (MCF) functionalized with aminopropylsilane (for the preparation, see: M. Shakeri et al. *Chem. Eur. J.* 2011, 17, 13269). Pd\(^0\)-AmP-MCF (palladium particles ø: 2–3 nm) catalyzed the C2-selective arylation of indoles and substituted diaryliodonium tetrafluoroborates to give the corresponding indole derivatives in 65–99% yield (15 examples).

**Comment:** The reactions of an electron-rich indole (3b), an N-methylated indole (3d), para-alkyl-substituted salts (3f, g), or an electron-deficient CF\(_3\)-substituted salt (3j) afforded high yields, whereas an N-benzylated indole (3e) or a naphthyl salt (3i) resulted in lower yield. ICP-OES analysis showed 0.6 ppm of palladium leaching from the reaction mixture (3a).

**Selected results:**
- **3a**: R\(^1\) = H, R\(^2\) = H, Ar = Ph; r.t., 6 h, 91% yield
- **3b**: R\(^1\) = MeO, R\(^2\) = H, Ar = Ph; 40 °C, 6 h, 86% yield
- **3c**: R\(^1\) = NO\(_2\), R\(^2\) = H, Ar = Ph; 50 °C, 25 h, 70% yield
- **3d**: R\(^1\) = H, R\(^2\) = Me, Ar = Ph; r.t., 6 h, 80% yield
- **3e**: R\(^1\) = H, R\(^2\) = MeC\(_6\)H\(_4\), Ar = Ph; 50 °C, 24 h, 65% yield
- **3f**: R\(^1\) = H, R\(^2\) = H, Ar = 4-MeC\(_6\)H\(_4\); 40 °C, 6 h, 83% yield
- **3g**: R\(^1\) = H, R\(^2\) = H, Ar = 4-t-BuC\(_6\)H\(_4\); r.t., 15 h, 84% yield
- **3h**: R\(^1\) = H, R\(^2\) = H, Ar = 2-MeC\(_6\)H\(_4\); 40 °C, 6 h, 78% yield
- **3i**: R\(^1\) = H, R\(^2\) = H, Ar = Np; 40 °C, 6 h, 67% yield
- **3j**: R\(^1\) = H, R\(^2\) = Me, Ar = 4-F\(_3\)CC\(_6\)H\(_4\); 40 °C, 6 h, 99% yield
- **3k**: R\(^1\) = H, R\(^2\) = Me, Ar = 4-MeOC\(_6\)H\(_4\); 40 °C, 6 h, 72% yield

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