**Co$_3$O$_4$–Nitrogen Complex for Hydrogenation of Nitroarenes**

**Preparation of a carbon-supported cobalt oxide nitrogen catalyst 1:**

\[
\text{Co(OAc)$_2$} \cdot 4\text{H}_2\text{O} + \text{EtOH} \quad \text{r.t., 30 min} \quad \xrightarrow{\text{Vulcan XC72R}} \quad \text{60 °C, 4 h} \quad \xrightarrow{\text{800 °C, 2 h}} \quad \text{Ar}
\]

**Results:**

- $\text{2a}$: 4 h, 91% yield
- $\text{2b}$: 4 h, 99% yield
- $\text{2c}$: 4 h, 99% yield
- $\text{2d}$: 6 h, 97% yield
- $\text{2e}$: 6 h, 94% yield
- $\text{2f}$: 6 h, 93% yield
- $\text{2g}$: 12 h, 96% yield
- $\text{2h}$: 4 h, 99% yield
- $\text{2i}$: 6 h, 96% yield
- $\text{2j}$: 4 h, 97% yield

**Significance:** A carbon-supported cobalt oxide-nitrogen catalyst 1 was prepared by pyrolysis (800 °C) of Co(phen)$_2$(OAc)$_2$ on Vulcan XC72R (an activated carbon). The hydrogenation of nitroarenes was carried out with 1 (1 mol% copper) in THF–H$_2$O under 50 bar of H$_2$ to give the corresponding anilines 2a–j in up to 99% yield.

**Comment:** The catalyst was reused nine times in the reaction of nitrobenzene where catalytic activity gradually decreased. The catalyst was characterized with TEM, energy-dispersive X-ray (EDX), XPS, and electron paramagnetic resonance (EPR).