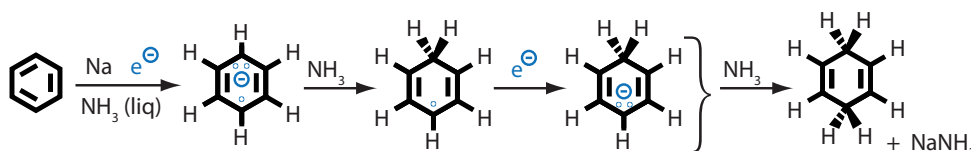


DISSOLVING METAL REDUCTIONS USING SiGNa CHEMISTRY MATERIALS

Conventional Method

The Birch reduction is a one-electron reduction of aromatic rings with alkali metals (Li, Na, K) dissolved in liquid ammonia. This reaction provides an alternative to catalytic hydrogenation, which is difficult to achieve with aromatics due to their extended conjugation. However, Birch reductions are avoided for scale-up due to the complexities of the large-scale process.

Birch Reduction Mechanism



Problems

- Difficulty in the handling of ammonia and ammonia waste streams due to toxicity
- Special design of process equipment required
- Safety and economic issues due to pyrophoric nature of alkali metals
- Operations, waste treatment, and both safety and economic issues

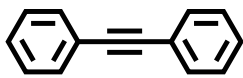


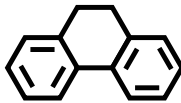
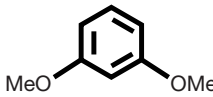
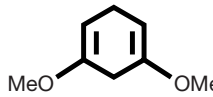
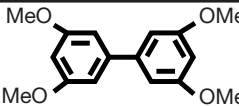
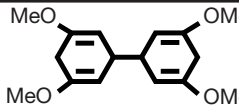
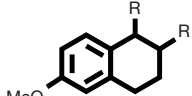
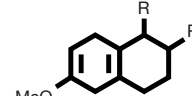
SiGNa MATERIAL DISSOLVING METAL REDUCTIONS

The SiGNa method improves yields, shortens reaction times, and simplifies workup procedures.

A Birch reduction performed using SiGNa material removes the hazards of alkali metals and does not require liquid ammonia or cryogenic temperatures.

Benefits

- Shorter reaction times
- No liquid ammonia or cryogenic temperatures required
- No special equipment needed for handling
- By-products are non-hazardous and environmentally friendly

Reactant	Product	Conv. (%)	Isolated Yield (%)
		100	92
		95	90
		85	81
		87	83
		94	89