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A Stable Rhodium-Coordinated Carbene with a $\sigma^0\pi^2$ Electronic Configuration
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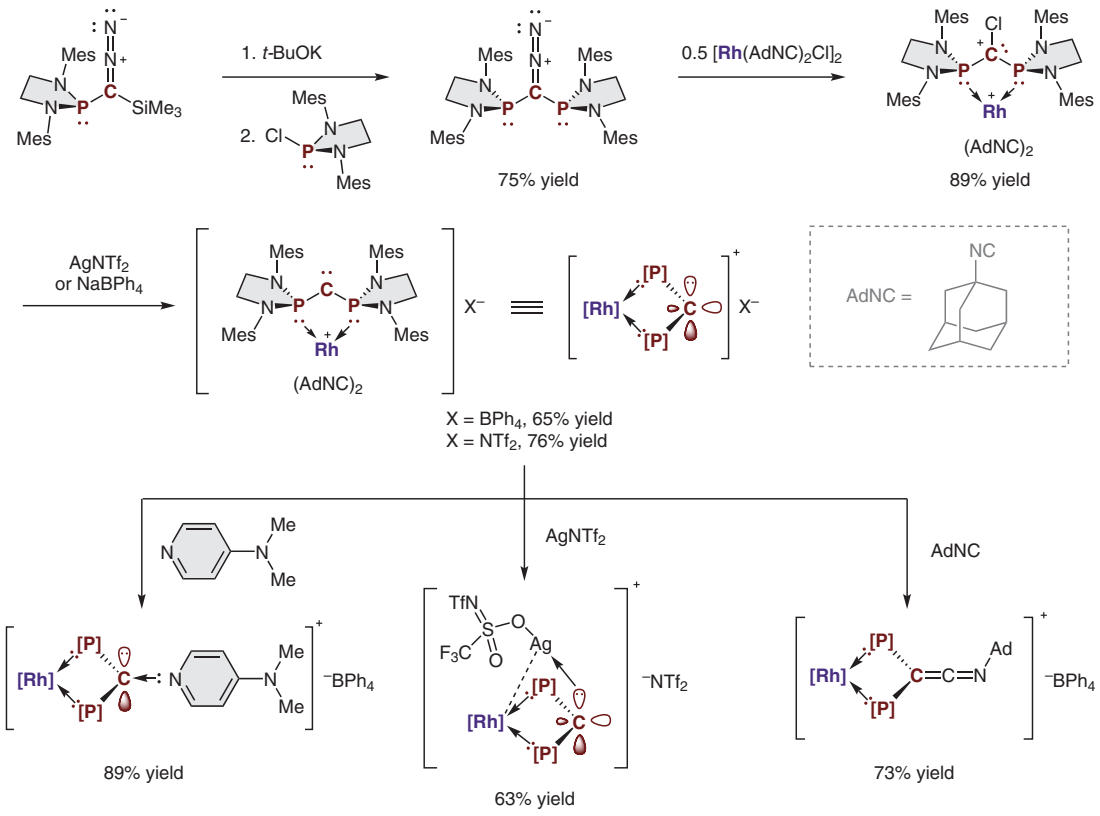
First Stable $\sigma^0\pi^2$ Carbene



Significance: Unlike the more commonly found $\sigma^2\pi^0$ singlet and $\sigma^1\pi^1$ triplet carbenes, the $\sigma^0\pi^2$ singlet carbene was previously unknown. Here, a rhodium-coordinated, cationic four-membered cyclic diphosphinocarbene is reported, presenting the unique $\sigma^0\pi^2$ ground state.

Comment: The rhodium coordinated, four-membered diphosphino-ring successfully realizes a finely balanced combination between the σ-electron delocalization/donation and π-electron negative hyper-conjugation effects, which help stabilize the $\sigma^0\pi^2$ singlet state. The new carbene is shown with different reactivity than the traditional carbenes.

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