Dual-Catalyst Photoinduced Alkenylation of Alkanes and Aldehydes via C–H Activation

**Significance:** The authors report a site-selective photoinduced alkenylation of various alkanes and aldehydes with aryl and heteroaryl alkenes. This dehydrogenative reaction utilizes two photoactive catalysts (tetra-n-butylammonium decatungstate (TBADT) as HAT agent and Co(dmgH)(dmgH2)Cl2), which eliminates the need for an external oxidant.

**Comment:** This mild alkenylation was used for the late-stage functionalization of diverse complex molecules, while still ensuring a high level of site-selectivity for the sterically most accessible and most electron-rich C–H bond. Wu and co-workers propose a mechanism that involves cooperation of the tungstate and the cobalt catalysts.

**Selected examples:**
- 59% yield from eucalyptol
- 51% yield, rr > 20:1, dr > 20:1, E/Z > 99:1 from a lithocholic acid derivative
- 75% yield, rr > 20:1, E/Z > 99:1 from a lithocholic acid derivative

**Proposed mechanism:**

\[
\text{R}^1 \text{H} + \text{R}^2 \rightarrow \text{R}^1 \text{R}^2
\]

\[\text{R}^1 \text{H}
\]

\[\text{MeCN, 60 °C, 12–24 h, blue LED}
\]

\[\text{>50 examples, 38–85% yield}
\]

\[\text{R}^1 = \text{Alk, (O)Alk, vinyl}
\]

\[\text{R}^2 = \text{Ar, HetAr, vinyl, alkynyl}
\]