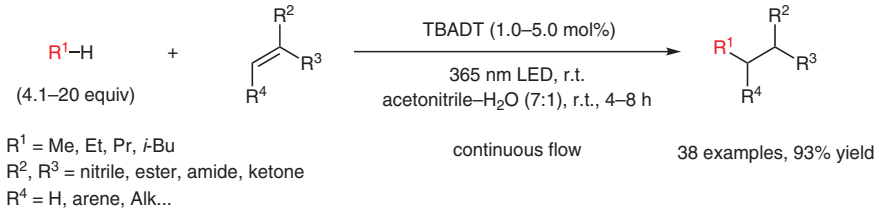
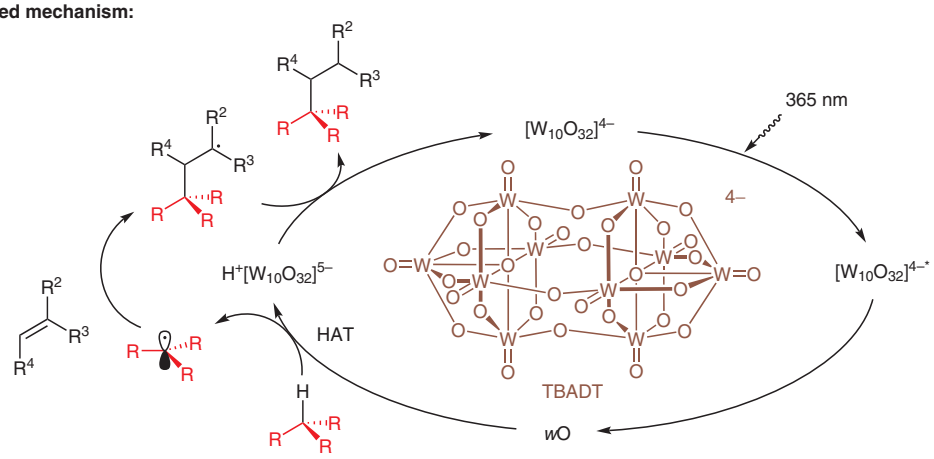
G. LAUDADIO, Y. DENG, K. VAN DER WAL, D. RAVELLI, M. NUÑO, M. FAGNONI, D. GUTHRIE, Y. SUN, T. NOËL* (EINDHOVEN UNIVERSITY OF TECHNOLOGY, THE NETHERLANDS)

C(sp^3)–H Functionalizations of Light Hydrocarbons using Decatungstate Photocatalysis in Flow
Science **2020**, *369*, 92–96.

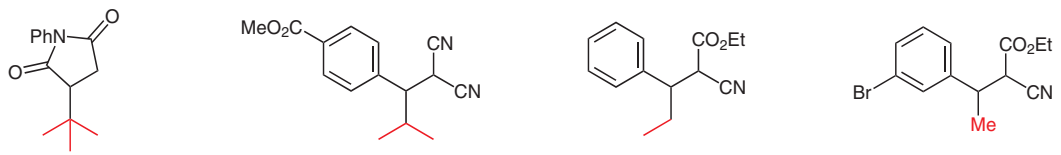
C–H Activation of Gaseous Alkanes



Proposed mechanism:



Selected examples:



90% yield
(*t*-Bu:*i*-Bu = 89:11)

92% yield
(*t*-Pr:*i*-Pr = 85:15)

77% yield
(dr = 1.2:1)

45% yield

Significance: Noël and co-workers describe a photocatalytic C–H activation of gaseous alkanes and subsequent trapping with various Michael acceptors in continuous flow. The corresponding alkylated products were obtained in moderate to excellent yields.

Comment: Mechanistically, the authors propose an initial activation of the photocatalyst TBADT, which relaxes to its active form *w*O. A hydrogen abstraction forms a carbon-centered radical, which undergoes a 1,4-addition to a Michael acceptor. Hydrogen back-donation affords the alkylated product and regenerates the catalyst.

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Flow Chemistry

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Synfact of the Month