

Driving synthesis by oxidation.



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The thermodynamically favored reduction of molecular oxygen provides an ideal source of energy with which to drive chemical synthesis. When controlled, aerobic oxidations can rapidly increase molecular complexity, often at the expense of creating water as the sole byproduct. This lecture will detail our group's efforts in developing catalytic aerobic transformations of phenols for the purposes synthesizing polyfunctional heterocycles and lignan natural products. We will also discuss a new strategy for the activation of low-valent metals, which couples the energetic requirements of metal-oxidation to the reduction of molecular oxygen by way of a quinone-catechol redox shuttle.