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Supporting Information

The Direct Amidation of α -Diketones with Amines via TBHP-Promoted Oxidative Cleavage of C(sp²)-C(sp²) Bond

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1. General considerations

All the reactions of acetophenones and formamides were carried out under an air atmosphere. ^1H NMR and ^{13}C NMR spectra were measured on a Bruker Avance NMR spectrometer (400 MHz or 100MHz, respectively) with CDCl_3 as solvent and recorded in ppm relative to internal tetramethylsilane standard. The peak patterns are indicated as follows: s, singlet; d, doublet; t, triplet; m, multiplet; q, quartet. The coupling constants, J , are reported in Hertz (Hz). High resolution mass spectroscopy data of the product were collected on a Waters Micromass GCT instrument. Solvents and general chemicals were purchased from commercial suppliers and used without further purification.

2. Typical procedure for the catalytic oxidative reaction

Under air atmosphere, a sealable reaction tube with a Teflon-coated screw cap equipped with a magnetic stir bar was charged with α -diketone (benzil, **1a**, 0.50 mmol), piperidine (**2a**, 0.50 mmol), *t*-BuOOH (TBHP, 2.0 mmol), and K_2CO_3 (0.50 mmol). The rubber septum was then replaced by a Teflon-coated screw cap, and the reaction vessel placed in an oil bath at 80 °C for 12 h. After the reaction was completed, it was cooled to room temperature and quenched with water and extracted with ethyl acetate. The resulting solution was directly filtered through a pad of silica gel using a sintered glass funnel, and concentrated under reduced pressure. The residue was purified by flash chromatography on silica gel (eluant: petroleum ether/ethyl acetate) to give the desired product phenyl(piperidin-1-yl)methanone (**3a**).

3. ^1H and ^{13}C NMR spectra of the products















































