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. $^1$H 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 $\alpha$-diketone (benzil, 1a, 0.50 mmol), piperidine (2a, 0.50 mmol), $t$-BuOOH (TBHP, 2.0 mmol), and K$_2$CO$_3$ (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. $^1$H and $^{13}$C NMR spectra of the products
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