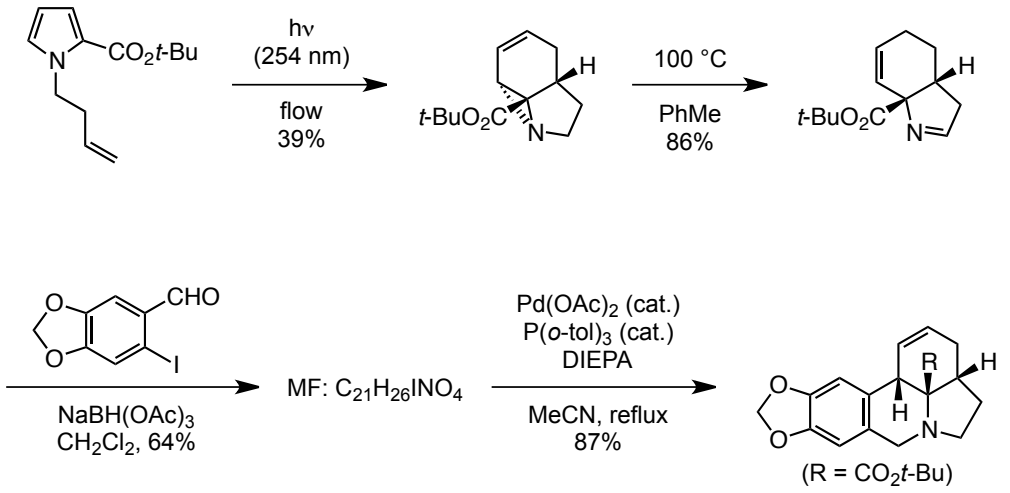

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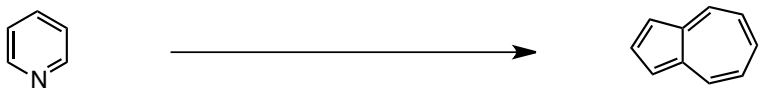
Explain the following transformation by indicating the chemical entities of (1)-(3).



1-Chloro-2,4-dinitrobenzene (20.3 g, 100 mmol) and anhydrous pyridine (120 mL) under nitrogen atmosphere were heated with stirring at 90 °C for 4 h (formation of a voluminous precipitate$_{(1)}$, initially colorless, then turning from yellow to finally brown), cooled to 0 °C, then slowly treated dropwise with pyrrolidine (18.1 mL, 220 mmol, clearing and turning to red$_{(2)}$) and stirred at r.t. for 16 h. The red solution was then treated with freshly (!) distilled cyclopentadiene (8.68 mL, 105 mmol) and then a solution of sodium methoxide in methanol [freshly prepared from sodium (2.30 g, 100 mmol) and MeOH (40.0 mL)] was added dropwise. The reaction mixture was then stirred at r.t. for 16 h, then concentrated by distillation with the application of a Vigreux column (30 cm, bath 130 °C) until 95 °C of the distillate, and subsequently allowed to cool to r.t. The distillate$_{(3)}$ was treated with anhydrous pyridine (200 mL), then heated to reflux for 6 d (bath 135 °C), and allowed to cool to r.t. After addition of distilled water (200 mL), the reaction flask was attached to a phase separator according to Figure 2, equipped with distilled water (300 mL) and isohexane (300 mL), heated to reflux (bath 125 ° C) so that steam distillation and phase separation proceeded simultaneously and steam distilled and extracted until colorless condensation of isohexane (1– 2 days). The deep-blue phase of isohexane was washed with 2 M aqueous HCl (3 x 100 mL), distilled water, then dried with Na_2SO_4, evaporated, purified by column separation (basic alumina, activity II, isohexane, first intensely blue band), filtrated through a D5 glass filter and evaporated. Yield: 4.4 g (36%); bluish black leaflets; mp 99–100 °C (Lit. 99– 100 °C); Rf = 0.67 (Al_2O_3 neutral, isohexane).

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