

## General Methods

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Melting points were recorded on a Toshniwal hot-coil stage melting point apparatus and are uncorrected. All chemicals used were commercial products (Aldrich, Lancaster, Fluka, Merck, SRL, Spectrochem or Qualigen) and were distilled or recrystallized whenever required.

$^1\text{H}$  NMR spectra were recorded on a 200 MHz or 400 MHz (Bruker) spectrometer. Chloroform-*d* was used as solvent unless otherwise was mentioned. Chemical shifts are reported in  $\delta$  unit and  $^1\text{H}$ - $^1\text{H}$  coupling constant in Hz. Data are reported as follows: chemical shifts, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, br = broad, m = multiplet, dd = double doublet, ABq = AB quartet).  $^{13}\text{C}$  NMR spectra were recorded on a 50 MHz or 100 MHz (Bruker) spectrometer with complete proton decoupling. Chemical shifts are reported in  $\delta$  unit from tetramethylsilane with the solvent resonance as the internal standard (deuteriochloroform: 77.0 ppm). Extra peaks due to C-F coupling in the  $^{13}\text{C}$  NMR spectra of Fluorinated compounds were reported in some cases where we are unable to identify C-F couplings. The carbon type ( $-\text{CH}_3$ ,  $-\text{CH}_2$  or  $-\text{CH}$ ) was determined by DEPT experiments. IR spectra were recorded as liquid films for oils and as KBr disks for solids on a Perkin Elmer 883 and Shimadzu FTIR-8300 infrared spectrometers, with peaks reported in  $\text{cm}^{-1}$ . EI-MS (70 eV) spectra were taken using a JEOL JMS600 instrument and ESI-MS spectra were taken using Waters LCT mass spectrometer. Elemental analysis was carried out by using an Elemental Analyzer Perkin Elmer 2400 Series II instrument. Single crystal X-ray diffraction analysis was performed on an Enraf Nonius Turbo CAD4 diffractometer at 298 K in IIT-Kharagpur. Elemental analyses were carried out at the Elemental analysis lab, Chemistry Department, IIT Kharagpur.

All the reactions in chapter IA, IB, were performed under an inert atmosphere of argon, where as all the reactions in chapter IIA, IIB, IIIA and IIIB were performed in open air.

All the dry solvents used for reactions were purified according to standard protocols. Benzene (PhH) and tetrahydrofuran (THF) were distilled from sodium-benzophenone under an atmosphere of dry argon / nitrogen. Dimethylformamide (DMF) was dried by azeotropic removal of water with benzene followed by distillation over calcium hydride. Acetonitrile (CH<sub>3</sub>CN) and dichloromethane (DCM) were dried first over calcium oxide (CaO) and then distilled over anhydrous phosphorous pentoxide and stored over molecular sieves (4 Å). Chloroform and triethylamine were dried following the literature procedure.

All the solvents for chromatography (column and PLC) were distilled prior to use. Chromatographic purification was done with 60-120 mesh silica gel or neutral alumina (SRL). For preparative layer chromatography (PLC) purifications, the layer was formed over glass plate using water gel (silica gel-GF254). For reaction monitoring, precoated silica gel TLC sheets (Merck) were used. Petroleum ether refers to the fraction boiling in the range 60-80 °C.

The phrase “usual workup” or “worked up in usual manner” refers to washing of the organic phase with water and brine, and drying over anhydrous sodium sulphate, filtration and evaporation under reduced pressure.

All the nomenclatures of the compounds were derived by using *Auto Nomenclature Standard* software.