

The synthesis of the cross-linker

The cross-linker TTT was synthesized in a one step procedure using triethylene tetramine coupling with methylacryloyl chloride. Triethylenetetramine (2.93 g, 0.02 mol) in dichloromethane (50 mL) was added dropwise to a continuously stirred mixture of methylacryloyl chloride (10.4 g, 0.10 mol), butylated hydroxytoluene (BHT) (0.04 g), 4-dimethylaminopyridine (DMAP) (0.04 g) and potassium carbonate (16.6 g, 0.12 mol) in acetonitrile (100 mL) in ice water bath. The resultant suspension was heated to 55 °C under stirring for a further 24 h and then filtered. The precipitate was washed with acetone and the organic fractions were combined, the solvent was removed under reduced pressure and the crude product was recrystallized from a solution mixture of ethyl acetate and acetonitrile(4:1, v/v) to yield as a white solid (5.63 g, 67.4%). ¹H NMR spectrum (CDCl₃): δ = 5.74 (d, 2H), 5.35 (d, 2H), 5.21 (d, 2H), 5.01 (d, 2H), 3.54 (d, 12H), 1.94 (s, 12H).