†Electronic Supplementary Information (ESI):

Powder X-ray diffraction (PXRD) study

Samples were analysed with a Bruker D8 Advance X-ray powder diffractometer, with CuKα radiation of wavelength 1.5406 Å, at current of 40 mA and voltage of 40 kV. The digitized patterns were recorded at 25 °C by step scanning method between 10 and 40° 2θ with the step size of 0.05° and step time of 1.0 s.

Differential Scanning Calorimetry (DSC) analysis

Thermal analysis of the nucleated α-LM crystals was performed using TA instrument Q 20 series Differential Scanning Calorimeter (DSC). Sample of 2 mg was taken in an aluminium pan and the DSC thermograms were recorded at a heating rate of 10 °C /min in temperature range from 40 to 240 °C under nitrogen atmosphere.

Purity estimation of the nucleated α-LM crystals using an automatic digital polarimeter

The specific rotations of the α-LM solutions were measured at 25 °C using ATAGO AP-300, automatic digital polarimeter. The first specific optical rotation reading was taken after 4 min from the reaction had started (i.e., dissolution of α- LM in DD water) because the 0.1 g of grown α-LM crystals which were ground to powder form take some more time to dissolve completely in 100 ml of water. The first 10 readings were plotted against the time and readings were noticed at the time interval of every 1 min. The line was drawn through these points, and it was extrapolated to zero time, that is the time of adding the 0.1 g powder in 100 ml water, in order to obtain the initial specific rotation (I). The final (equilibrium) reading was taken after the time span of 24 h. The final equilibrium rotation is considered as the final specific rotation.

Morphology and growth of the nucleated α-LM crystals

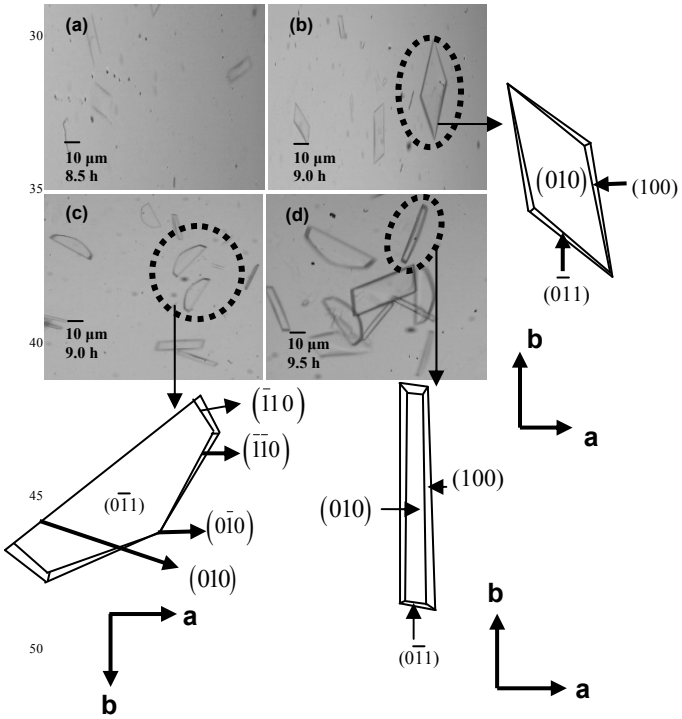

Fig.S1 The α-LM crystals obtained with needle, trapezoidal and triangular like morphology at (a) 8.5 h, (b) 9.0 h, (c) 9.0 h and (d) 9.5 h in 8D : 2W solvent mixture by fast evaporation

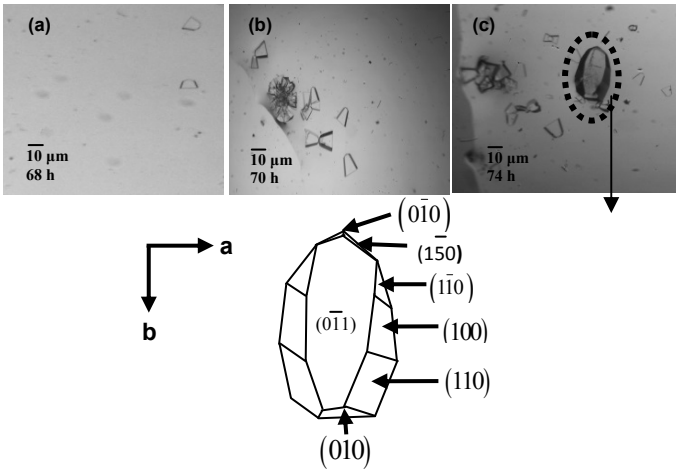

Fig.S2 The tomahawk morphology of α-LM crystals obtained at (a) 68 h, (b) 70 h and (c) 74 h in 7D : 3W solvent mixture by fast evaporation

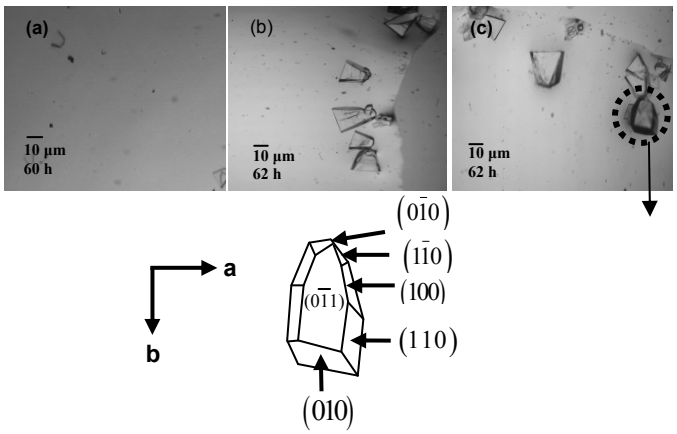

Fig. S3 The tomahawk morphology of α-LM crystals obtained at (a) 60 h, (b) 62 h and (c) 62 h in 6D : 4W solvent mixture by fast evaporation

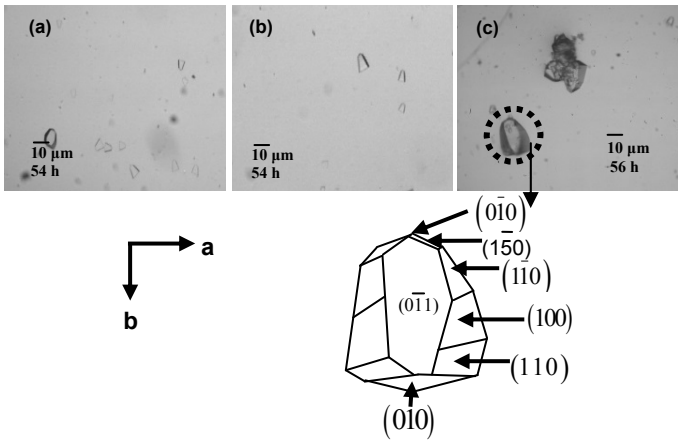

Fig. S4 The tomahawk morphology of α-LM crystals obtained at (a) 54 h, (b) 54 h and (c) 56 h in 5D : 5W solvent mixture by fast evaporation

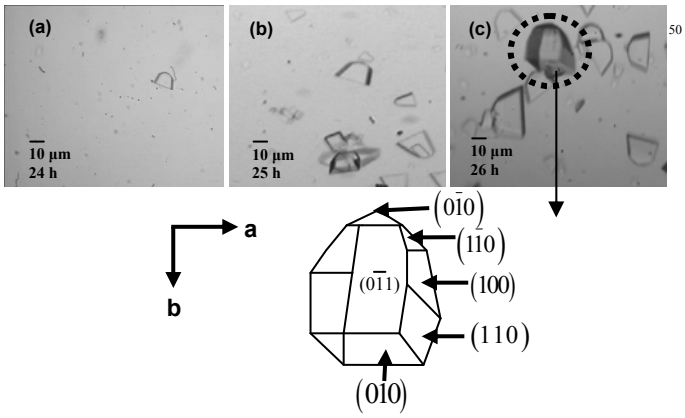

Fig. S5 The tomahawk morphology of α-LM crystals obtained at (a) 24 h (b) 25 h and (c) 26 h in 4D : 6W solvent mixture by fast evaporation

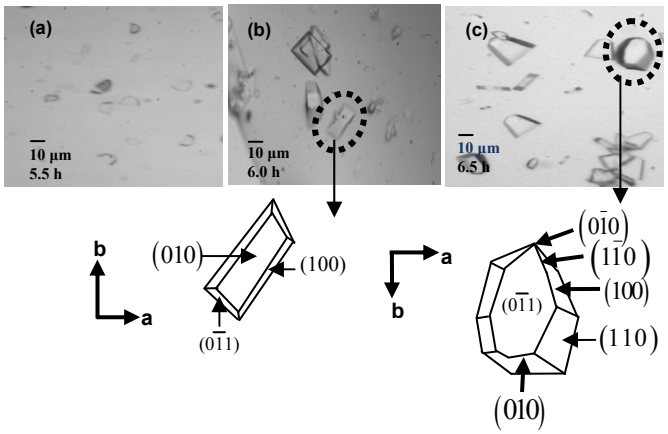

Fig. S6 The α-LM crystals obtained with parallelogram, trapezoidal and tomahawk like morphology at (a) 5.5 h, (b) 6.0 h and (c) 6.5 h in 3D:7W solvent mixtures by fast evaporation

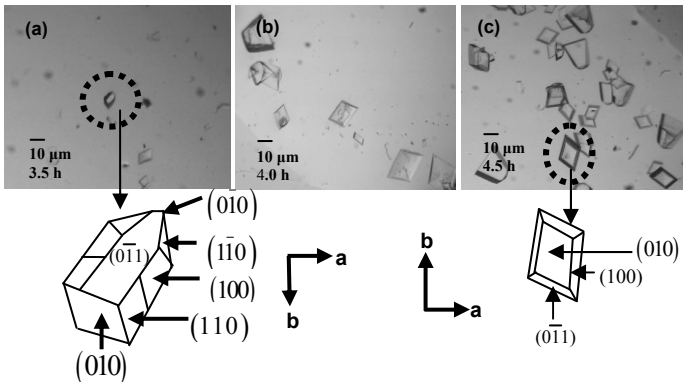

Fig. S7 The α-LM crystals obtained with parallelogram, trapezoidal and tomahawk like morphology at (a) 3.5 h, (b) 4.0 h and (c) 4.5 h in 2D:8W solvent mixtures by fast evaporation