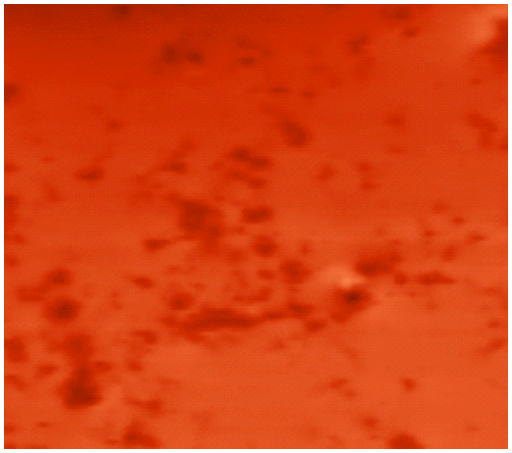

TDI70

Figure S1: *AFM* topograph of aromatic (*TDI* based) polyurethane of 70% *HSC*.

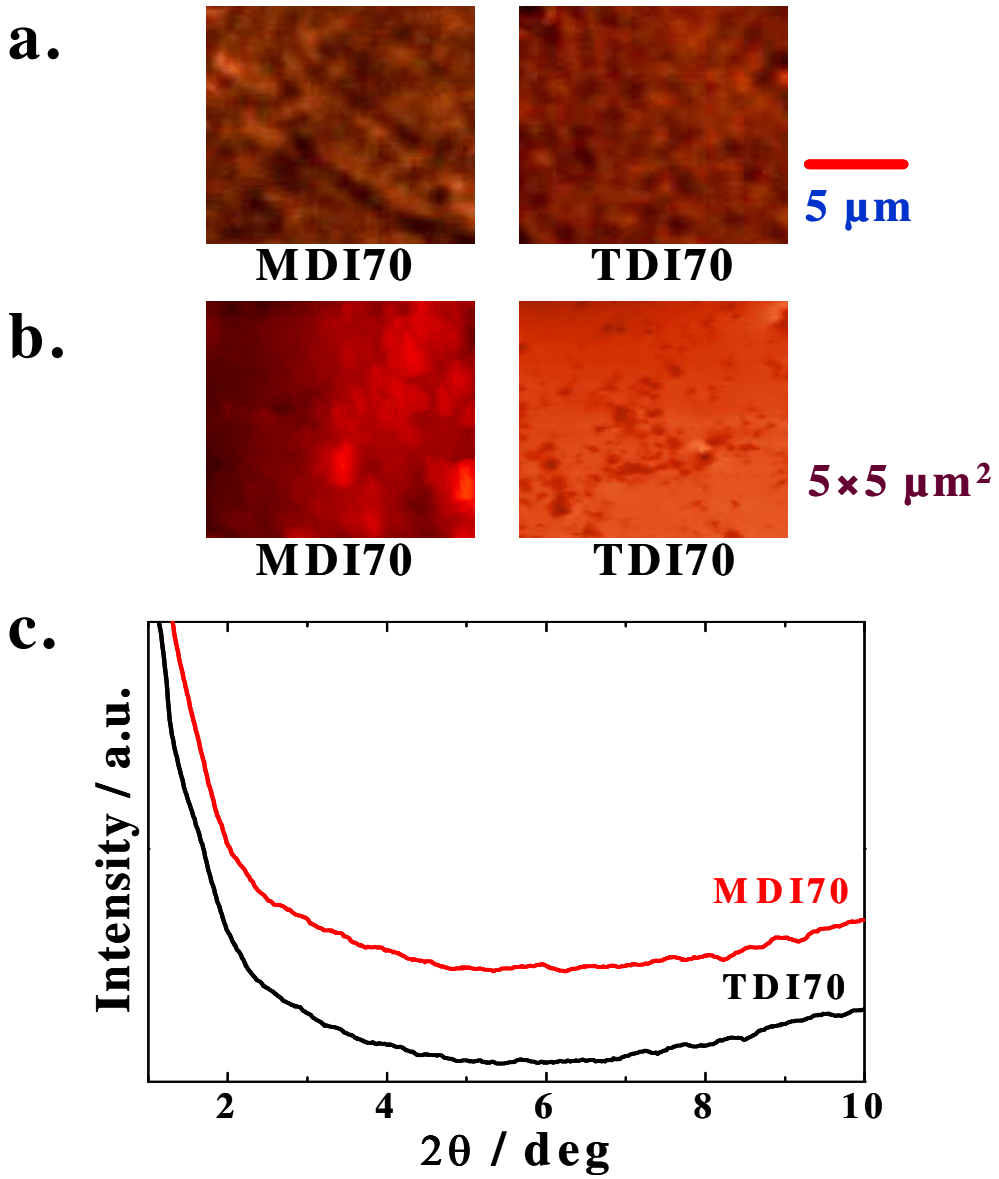

Figure S2: The self-assembled microstructure and nanostructure of aromatic polyurethanes with high (70%) *HSC* content. (a) Optical images of different indicated aromatic *PU*s showing minimal cluster size. (b) *AFM* micrographs for tow indicated aromatic *PUs* which do not exhibit any pattern there, except few agglomerates. (c) The *X*-ray diffraction patterns for indicated *PU*s showing no nanostructures.

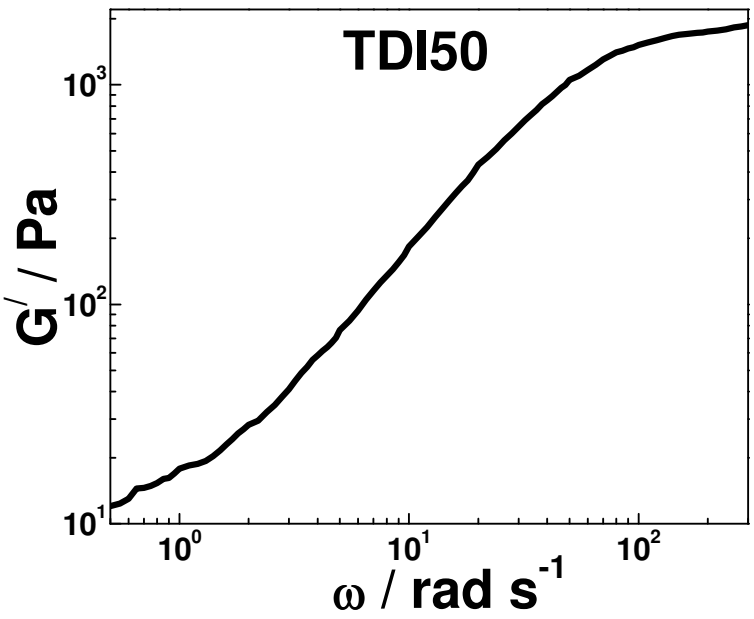

Figure S3: Frequency dependence storage modulus of aromatic (*TDI* based) polyurethane of 50% HSC.

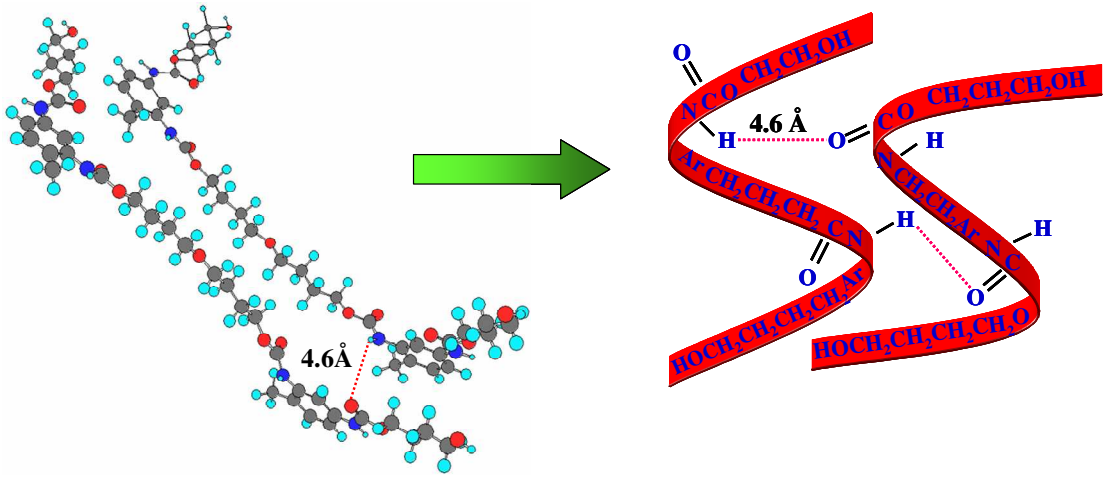

Figure S4: Molecular model of aromatic polyurethane (*TDI* based) molecules obtained from energy minimized electronic structure calculation from a part of chains in the left side showing the distance of hydrogen bonded interaction sites leading to self-assembly in aromatic diisocyanate and right portions indicate the schematic view of the organization from a bigger chain. Parallel and curved chains are expected in aromatic polyurethanes with longer hydrogen bonded distance as compared to aliphatic one.