**Highlights**

1. Crystal defects, dislocations, and agglomerations are the common facts in almost all crystals during synthesis.
2. Scherrer method for crystallite size estimated is not enough for the structural analysis of the synthesized nanomaterials where intrinsic strain gets developed due to the point defect, grain boundary, triple junction and stacking faults.
3. Annealing at high temperature creates lattice imperfections and reduces photocatalytic efficiency in ZnO samples.

