

LIST OF SCHEMES

- Scheme 1.1:** Synthesis of epoxy resins from di/polyols
- Scheme 1.2:** Synthesis of hyperbranched epoxy by end group modification of a hyperbranched polymer
- Scheme 1.3:** Synthesis of hyperbranched epoxy by proton transfer reaction
- Scheme 1.4:** Synthesis of hyperbranched epoxy by polycondensation reaction
- Scheme 1.5:** Preparation of polymer nanocomposite by solution technique
- Scheme 1.6:** Preparation of polymer nanocomposite by *in-situ* technique
- Scheme 1.7:** Preparation of polymer nanocomposite by melt mixing technique
- Scheme 2A.1:** Synthesis with possible general structure of PHE resins
- Scheme 2B.1:** Preparation of PAD by Michael addition reaction
- Scheme 2B.2:** Synthetic scheme along with possible general structure of TAHE resins
- Scheme 2C.1:** Synthesis of HBPP resin
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- Scheme 3A.1:** Different physico-chemical interactions of modified clay with hyperbranched epoxy and hardener based on the Halpin-Tsai aligned parallel model
- Scheme 4A.1:** Possible mechanism for the formation of carbon dot particles
- Scheme 4B.1:** Crosslinking reactions among the hyperbranched epoxy, PAA hardener and carbon dot
- Scheme 4B.2:** Different physico-chemical interactions of carbon dot particles with hyperbranched epoxy and PAA hardener
- Scheme 4C.1:** (a) Chemical reactions of the reactants and carbon dot during the formation of CHE *in-situ* nanocomposite and (b) its general structure
- Scheme 5A.1:** Reduction mechanism for the preparation of carbon dot reduced Cu₂O nanohybrid
- Scheme 5A.2:** Photocatalytic mechanism for nanocomposite film
- Scheme 5B.1:** Formation of ECDCONC