

Curing Modes Most dental composites cure via radical chain polymerization in which monomers are converted to polymers. The CQ molecule in the excited triplet state rapidly interacts via electron transfer with an amine to constitute an excited complex, and then extracts hydrogen from the amine to make up a new compound. The excitation energy is transferred to the amine molecule during the process, the  $\alpha$ -amino-alkyl radical is more efficient at initiating polymerization than the relatively inactive CQ-ketyl radical.<sup>20</sup> Heat-cured composites are polymerized by extra-oral cure involving heat that might help reduce the quantity of remaining double bonds resulting in improvements in mechanical properties. They have significant effects on the kinetics of polymerization and the polymer structure, thus affecting various properties of the composites.<sup>18</sup> According to the initiation systems or cure mechanisms, composites can be divided into chemically initiated/self-cured, light-activated, heat-cured, or dual-cured composites.<sup>19</sup> For self-cured/chemical-cured composites, when the powder-liquid or paste-paste materials are mixed together, polymerization is initiated by an oxidation-reduction initiator system at room temperature. Light-activated composites undergo polymerization by irradiation via a blue-light-curing unit in the wavelength range of 410–500 nm.<sup>12</sup> These days, almost all dental restorative composites contain CQ/amine complex initiation, visible light-cured, which is safer compared with UV-curing systems, and one-component systems.