The search for advanced, high performance, high temperature resistant polymers is on the rise in view of the growing demand for polymer matrix composites that are to meet stringent functional requirements for use in the rapidly evolving high-tech area of aerospace. Cyanate esters (CEs) form a family of new generation thermosetting resins whose performance characteristics make them attractive competitors to many current commercial polymer materials for such applications. The chemistry and technology of CEs are relatively new and continue to evolve and enthuse researchers. The CEs are gifted with many attractive physical, electrical, thermal, and processing properties required of an ideal matrix resin. These properties are further tunable through backbone structure and by blending with other polymer systems. The structure-property correlation is quite well established. Several new monomers have been reported while some are commercially available. The synthesis of new monomers has come to a stage of stagnation and the present attention is on evolving new formulations and processing techniques. The blends with epoxy and bismaleimide have attracted a lot of research attention and achieved commercial success. While the latter is now known to form an IPN, the reaction mechanism with epoxy is still intriguing. Extensive research in blending with conventional and high performance thermoplastics has led to the generation of key information on morphological features and toughening mechanisms, to the extent that even simulation of morphology and property has now become possible. Despite the fact that the resin and its technology are nearly two decades old, the fundamental aspects related to curing, cure kinetics, reaction modeling, etc. still evince immense research interest and new hypotheses continue to emerge. The system enjoys unprecedented success for applications in microelectronics, aerospace, and related areas. CEs tend to be the resin of choice in advanced composites for aerospace and high-speed electronics. The objective of the present article is to analyze recent developments in the chemistry, technology, and applications of cyanate esters. It mainly focuses on the advancements in research and development related to fundamental and applied aspects of cyanate esters during the last few years. It also gives a brief account of the overall scenario of the developments in this area, prior to discussing recent trends in detail.

Keywords. Cyanate ester, Polycyanurates, Phenolic-triazine, Polymer matrix composite, Cure kinetics, Polymer blends, Cyanate-epoxy blend, Bismaleimide-triazine resins, Aerospace structure