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Biodegradable Epoxy Networks Cured with Polypeptides SHIGEO NAKAMURA, Ajinomoto Co., Inc., EDWARD J. KRAMER, University of California, Santa Barbara — Epoxy resins are used widely for adhesives as well as coatings. However, once cured they are usually highly cross-linked and are not biodegradable. To obtain potentially biodegradable polypeptides that can cure with epoxy resins and achieve as good properties as the conventional phenol novolac hardeners, poly(succinimide-co-tyrosine) was synthesized by thermal polycondensation of L-aspartic acid and L-tyrosine with phosphoric acid under reduced pressure. The tyrosine/succinimide ratio in the polypeptide was always lower than the tyrosine/(aspartic acid) feed ratio and was influenced by the synthesis conditions. Poly(succinimide-tyrosine- phenylalanine) was also synthesized from L-aspartic acid, L- tyrosine and L-phenylalanine. The thermal and mechanical properties of epoxy resins cured with these polypeptides are comparable to those of similar resins cured with conventional hardeners. In addition, enzymatic degradability tests showed that Chymotrypsin or Subtilisin A could cleave cured films in an alkaline borate buffer.

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