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Effect of Hydrolysis on Mechanical Behavior of TCP/PLLA Composites SATOSHI KOBAYASHI, SHUSAKU YAMAJI, Tokyo Metropolitan University — Bioactive ceramics/poly-L-lactic acid (PLLA) composites have been expected as a material for the bone fracture fixations which have more biocompatibility than monolithic PLLA. In this study, hydrolysis behavior of tricalcium phosphate (TCP)/PLLA composites containing three different TCP contents (5, 10, 15 wt%) in simulated body environment were characterized. These specimens were immersed in phosphate buffered solution. Tensile tests were conducted on the specimen after immersion in various strain rates. In order to predict stress-strain behavior after immersion, damage micromechanical analysis proposed by the authors were conducted. In this model, nonlinear behavior in stress strain relationship were simulated considering interfacial debonding between TCP particle and PLLA matrix. For the purpose of deciding the interfacial strength, such as critical energy release rate, curve fitting was conducted on the result of 15wt% composites under three types of strain rates. Theoretical results using the interfacial strength obtained on 5wt% and 10wt% composites were in good agreement with experimental results. This result indicated that interfacial strength was dependent only on strain rate and was independent from TCP fraction.

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