

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Robust Bonding of Tough Double Network Hydrogel to Bone

TAKAYUKI NONOYAMA, SUSUMU WADA, RYUJI KIYAMA, NOBUTO KITAMURA, TAKAYUKI KUROKAWA, TASUKU NAKAJIMA, KAZUNORI YASUDA, JIAN PING GONG, Hokkaido University — Tough Double Network (DN) hydrogels are one of candidates as next-generation artificial cartilage from the viewpoints of low friction, water storage capability and toughness. For practical use, the hydrogel must be strongly fixed at the joint. However, strong fixation of such hydrogel to other materials (tissues) has not been achieved yet because the surface property of hydrogel is almost equal to water due to its high water content. Therefore, robust adhesion for fixation and low friction for lithe motion are trade-off relation. Here, we report robust fixation of hydroxyapatite (HAp) mineralized DN hydrogel to the bone without any toxicity. HAp is main inorganic component of bone tissues and has osteoconductive capability. After 4 weeks implantation of HAp/DN gel into rabbit femoral groove, The robust fixation between bone and HAp/DN gel, more than strength of gel matrix, was achieved. The methodology is universal for new biomaterials, which should be fixed on bone, such as ligament and tendon systems.

Takayuki Nonoyama
Hokkaido University

Date submitted: 14 Nov 2016

Electronic form version 1.4