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TITLE

Materials Science for Drug Delivery Systems and Cell Cultures

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Poly(N-isopropylacrylamide) (PNIPAM) gels have attracted considerable attentions from both academic and technological aspects. At the phase transition temperature (ca. 34 oC), PNIPA gels undergo an abrupt volume change, which can be utilized in several promising applications such as drug delivery systems and actuators (see H. Yan, et al., Angew. Chem. Int. Ed. 2005, 44, 1951; Colloid. Surf. B 2005, 46, 142.). Recently we reported on controlled-releasing profile of the PNIPA-PMDP gel system using (+)-L-ascorbic acid and temperature as a targeted drug and a stimulus, respectively.

On the other hand, Solid surfaces in contact with biological cells play an important role in cell cultures. In vivo, most cells are embedded within an intricate extracellular matrix, which not only binds the cells and tissues together but also influences cellular development, polarity, and behavior. In this talk I present three unique types of solid surfaces, i.e., super water-repellent surfaces, honeycomb polymer films, and thermo-responsive polymer-grafted glass surfaces. Preparation and physical properties are presented first followed by highlights of recent progress in cell culture on the solid surfaces (see H. Yan, et al., Angew. Chem. Int. Ed. 2005, 44, 3453; Current Chemical Biology 2007, 1, 290).

Biography

Upon completion of his doctorate in chemistry at The University of Tokyo in 1995, Dr. Yan joined the R&D group at Ibaraki Research Laboratory, Hitachi Chemical Industry Co. Ltd. where he carried out research works to develop sophisticated electronic components by utilizing functional polymers. After his research works on conductive polymers at Tokyo University of Science, Yamaguchi for 6 years, on polymer gels and super water-repellent materials at Hokkaido University for 3 years, and on organic FETs and organic transparent electrodes in University of Yamanashi for 4 years where he is an associate professor, Dr. Yan returned back to Department of Chemistry, Zhengzhou University, China in September 2011 where he is a professor. Before his above career in Japan, Dr. Yan had been educated in China, i.e., in Jilin University (1978-1982) for Bachelor of Science on polymer chemistry and in Henan Institute of Chemistry/Zhengzhou University (1984-1987) for Master of Science on inorganic chemistry. Dr. Yan has published 12 books, 76 papers, and 31 patents. Currently, Dr. Yan is also an Editorial Board Member, Journal of Bioequivalence & Bioavailability (OMICS Publishing Group, USA), and an Editorial Advisory Board Member, Recent Patents on Materials Science (Bentham Science Publishers, Ltd., USA).