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## NIPA Gels and PLGA nanoparticles: Applications in drug delivery systems

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**P**oly (N-isopropylacrylamide) (NIPA) gels have attracted considerable attentions from both academic and technological aspects. At the phase transition temperature (ca. 34°C), NIPA gels undergo an abrupt volume change, which can be utilized in several promising applications such as drug delivery systems and actuators. NIPA bulk/micro gels containing polymer surfactant poly (2-(methacryloyloxy) decylphosphate) (PMDP) was synthesized and it was found to show rapid volume phase transition above its transition temperature. Structurally NIPA-PMDP gel system contains the trapped micelles of PMDP inside the PNIPA networks. Therefore, at least in principle the gel system tightly stores targeted drug in the micelles and rapidly releases controlled amount of the drug by switching on-off of external stimuli such as temperature or infrared laser beam. Recently we reported on controlled-releasing profile of the NIPA-PMDP gel system using (+)-L-ascorbic acid and temperature as a targeted drug and a stimulus, respectively. The NIPA and NIPA-PMDP gels were used to obtain an on-off release profile of (+)-L-ascorbic acid in response to a temperature change. The NIPA-PMDP gel released the L(+)-ascorbic acid slowly and gradually with time at 27°C which is lower than the phase transition temperature, 34°C. The gel did not stop the release within the investigated time scale. On the other hand, the gel rapidly released the drug and finished the release within 10 min at 40°C which is higher than the phase transition temperature. Herein the author will also talk on synthesis of PLGA nanoparticles and their drug-loadings.

### Biography

Hu Yan completed his Bachelor of Science from Jilin University (1978-1982) and Master of Science from Henan Institute of Chemistry (1984-1987). Upon completion of his Doctorate in Chemistry at The University of Tokyo in 1995 he 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 and on polymer gels at Hokkaido University for 3 years, he joined the Laboratory of Organic Robotics at the University of Yamanashi in 2007 where he is an Associate Professor, He is a full Professor of Zhengzhou University since 2011 and has published 8 books, 60 papers, and has 31 patents.

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