pH Stimulus Polymers: A Brief Overview of their Scope and Applications

Abstract

Latest advancement in the field of material science is the development of smart polymers. Smart polymers are sensitive to external stimuli. There are numerous external factors that can act as stimuli such as light, temperature, pH, stress, magnetic, electric field and many more. In this work, we will provide a brief overview of different polymers that are considered as intelligent polymers on their pH stimuli response, classes along with mechanisms, synthesis techniques and latest applications in the field of nanotechnology, biotechnology, tissue engineering and material sciences. Smart polymers find most common applications in medicine such as dentistry and drug delivery system. In drug delivery system, the pH responsive polymer allows the encapsulated drug to spread specifically when pH vary from the required level. The most prominent advantage of smart polymers in bio sciences is their sensitivity. With little change in external environment conditions, the change in structure of smart polymers take place e.g. swelling/ de-swelling and break down. Improvement in bio-compatibility and biodegradability can enhance their performance. The first section of this article will discuss significance of smart polymers, pH responsive phenomenon and their importance. In the second part, classes of pH responsive polymers, structure, different examples, applications and several challenges that are barrier in progress of pH responsive polymers will be addressed. Slow response time is one of the common problem in smart polymers. Lastly, we will discuss latest advancement, new researches and future trends of pH sensitive polymers

Keywords: Smart polymers, Stimuli, pH responsive polymer, bio-compatibility