

Shaping Macromolecules for Sensing Applications—From Polymer Hydrogels to Foldamers

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Rok wydania

2022

Czasopismo

Polymers

Numer woluminu

14

Strony

580/1-580/32

DOI

10.3390/polym14030580

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Sensors are tools for detecting, recognizing, and recording signals from the surrounding environment. They provide measurable information on chemical or physical changes, and thus are widely used in diagnosis, environment monitoring, food quality checks, or process control. Polymers are versatile materials that find a broad range of applications in sensory devices for the biomedical sector and beyond. Sensory materials are expected to exhibit a measurable change of properties in the presence of an analyte or a stimulus, characterized by high sensitivity and selectivity of the signal. Signal parameters can be tuned by material features connected with the restriction of macromolecule shape by crosslinking or folding. Gels are crosslinked, three-dimensional networks that can form cavities of different sizes and forms, which can be adapted to trap particular analytes. A higher level of structural control can be achieved by foldamers, which are macromolecules that can attain well-defined conformation in solution. By increasing control over the three-dimensional structure, we can improve the selectivity of polymer materials, which is one of the crucial requirements for sensors. Here, we discuss various examples of polymer gels and foldamer-based sensor systems. We have classified and described applied polymer materials and used sensing techniques. Finally, we deliberated the necessity and potential of further exploration of the field towards the increased selectivity of sensory devices.

Słowa kluczowe

polymer gels, hydrogels, foldamers, sensing, biosensing

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Adres publiczny

<http://dx.doi.org/10.3390/polym14030580>

Strona internetowa wydawcy

<http://www.mdpi.com/journal/metals>