



WYDZIAŁ CHEMICZNY
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**Otrzymywanie i charakterystyka wybranych właściwości
miktoramiennych polimerów gwiazdzistych zawierających
segmenty degradowalnych poliestrów**

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Summary

In the present work, new amphiphilic miktoarm star-shaped polymers containing pH-/thermosensitive polymethacrylate arms and degradable polyester segments were designed, synthesized and characterized. Controlled polymerization methods such as ATRP, ROP and *click chemistry* reaction were used. Three approaches were used in the synthesis of miktopolymers. In the *coupling* method, the star (co)polymers obtained at an earlier stage composed of DMAEMA and HEMA were combined with linear polyesters such as PCL, PLA, PLGA or PLGCL, using the *click chemistry* reaction. The second approach was a *one-pot* reaction involving simultaneous ATRP reactions of DMAEMA, ROP of cyclic (di)esters and *click chemistry* reactions of the resulting polymers. In the aforementioned cases, gluconamide- or lactobionamide-based sugar derivatives were used as initiators for the ATRP reaction. On the other hand, in the third approach, a linear macroinitiator (PDMAEMA) was obtained by the *arm-first* method, to which a crosslinking agent in the form of glycerol dimethacrylate was added, which led to the formation of a star polymer. Owing to the presence of hydroxyl groups in the core of the star-shaped polymer, the ROP reaction of selected cyclic (di)esters was carried out, leading to the preparation of a miktoarm polymer (*in-out* method).

The obtained compounds were characterized by spectroscopic (^1H NMR, FTIR-ATR, UV-Vis), chromatographic (GC, SEC) and thermoanalytical (DSC) methods. In addition, T_{CP} values were determined for pH-/thermosensitive solutions of (mikto)star polymers in water and PBS. Subsequently, the presence of polyester arms in the miktopolymers allowed both enzymatic and hydrolytic degradation of selected compounds. The determined T_{CP} values, as well as the rates of degradation of individual miktopolymers, depended on the length of the polymethacrylate arms, the content of the hydrophilic fraction in the macromolecule and the composition of the polyester arm.

The study showed that among the methods used for the synthesis of miktoarm star-shaped polymers, the *one-pot* reaction allowed to obtain complex polymeric structures with high efficiency in a short time.