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Novel synthetic pathway for multicyclic polymers

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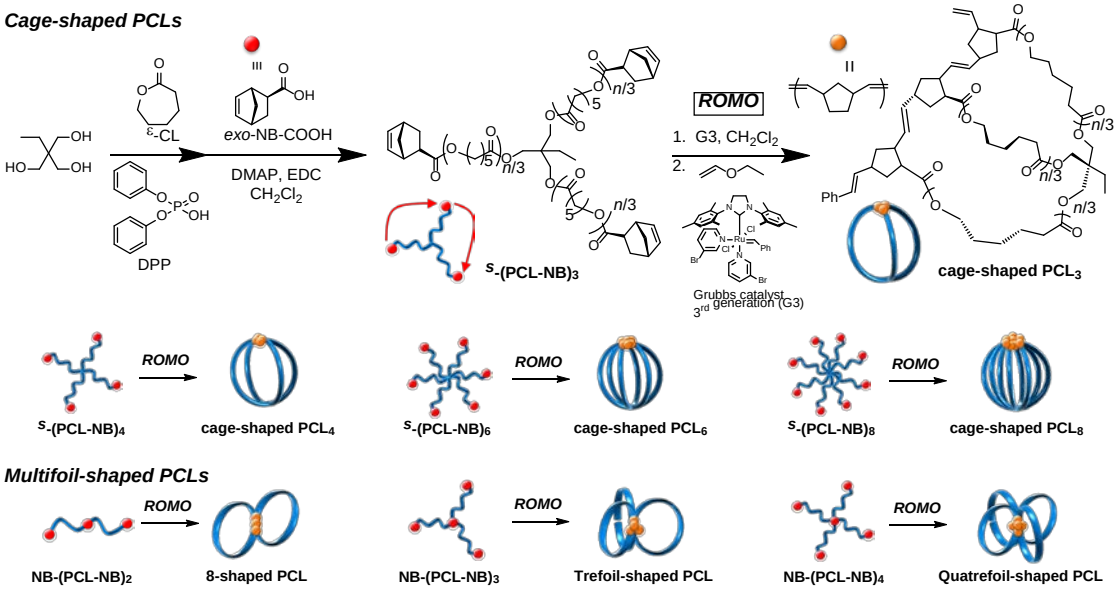
Macromolecules possessing cyclic architectures have attracted much attention because of their interesting properties due to the absence of the polymer chain ends[1]. Therefore, multicyclic polymers, such as cage-shaped, 8-shaped and trefoil-shaped polymers, have been synthesized to investigate their unique properties. However, the synthesis of multicyclic polymers still remains challenging because of the complicated structures. Here, we propose a new synthetic strategy to multicyclic polymers, which involves the intramolecular consecutive cyclization of end-functionalized star polymer precursor with polymerizable groups. In this work, we attempted the synthesis of multicyclic poly(ε-caprolactone)s (cage- and multifoil-shaped PCLs) by the intramolecular consecutive ring-opening metathesis origomerization of star-shaped PCL with norbornenyl groups at the ω-chain ends and the center position (*s*-(PCLNB)$_x$) and NB-(PCL-NB)$_y$) (Scheme).



Scheme. Synthetic pathway for multicyclic PCLs

References

1) T. Yamamoto, Y. Tezuka, *Soft Matter*., 11, 7458-7468 (2015)