第２０回錯体物性化学講演会

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有機、無機および生物化学的な合成手法を駆使した機能性 DNA ワイヤーの研究を精力的に展開されている Andrew Pike 博士（University of Newcastle, UK）をお招きして、講演会を開催いたします。
皆さまのご来聴をお待ち申し上げます。

日時：2016 年 2 月 2 日（火）16:00 ～ 17:30

場所：ウエスト１号館　B-314 号室

講演タイトル：

Towards the fabrication of highly controlled functional DNA wires via sequence controlled enzymatic synthesis

Abstract: The self-assembling nature of DNA provides a perfect template to engineer a conducting wire. However, DNA needs modification to afford it additional functionality and in this talk I will report an enzyme based route with potential for the fabrication of DNA based nanowire systems.
The method developed is able to synthesise long modified double stranded DNA of controllable length and that are capable of binding metals for the production of template nanowires.
A PCR-based method has been developed, which is capable of annealing DNA duplexes to form ‘sticky ends’, followed by extension with an archael Pyrococcus furiosus Family B Polymerase variant, Z3, or a Thermococcus gorgonarius Family B Polymerase exonuclease minus variant (Tgo). The sequences included poly[A].poly[T], poly[G].poly[C], [AG]/[TC], [AAG]/[TTC], [AAAG]/[TTTC], [AAAAG]/[TTTTC], [A9G]/[T9C], [GATC]/[CTAG] and [ACTGATCAGC]/[TGACTAGTCG] of 20 or 21 base pairs in length as starting material.
This method produced DNA duplexes of up to 50,000 base pairs in length (approximately 17μm) after only 20 PCR cycles with normal bases. The exchange of standard based for modified NTPs, e.g. 6-thio-dGTP for dGTP, resulted in extension of the duplex from 20 base pairs to a maximum average of 6000 base pairs with Tgo (A9G/T9C) and 300 base pairs with Z3 (GATC). Some results on the further functionalization of long modified DNA for sensing and electronic applications will be considered.
The controlled incorporation of multiple modifications into double stranded DNA allows for the production of modified DNA capable of binding metals, functionalisation through click-chemistry and has potential to produce uniform and precisely controlled nano-scale materials

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