End-functional star polymers via Living Radical Polymerisation and Click chemistry

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Synthesis of well-defined polymers for reaction with proteins has attracted a growing interest for applications in biotechnology. Controlled Radical Polymerisation techniques such as ATRP are an efficient way to prepare polymers with well-defined compositions and architectures (linear, graft, star polymers).[1,2] The Cu^{I}-catalysed version of the Huisgen 1,3-dipolar cycloaddition of azides on alkynes is a powerful example of "Click" chemistry with easy availability of starting materials, very high conversion and complete regioselectivity.[3]

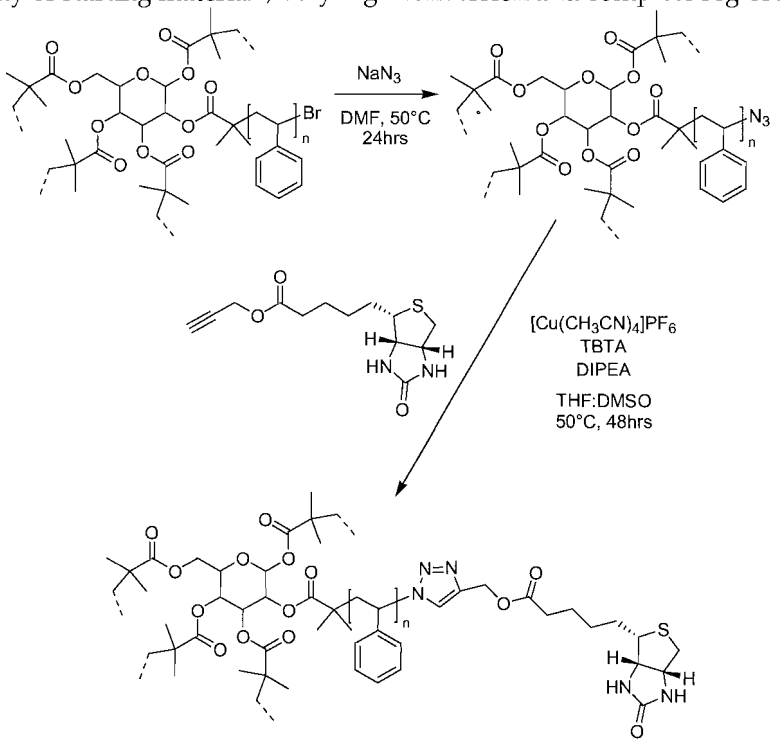

Figure 1: Scheme for the Biotin-functionalisation of a 5-arm star polymers via "click" chemistry.

This work describes the combined use of Controlled Radical Polymerisation and "Click" Chemistry to synthesise biotin end-functionalised star polymers.[4] Polystyrene star polymers have been prepared from a glucose core with controlled molecular architecture. The terminal groups of the polymer have first been converted into azide and then been successfully clicked to an alkyne functionalised biotin coumpound, Figure 1. The functionality of the stars was showed by a multi-phase HABA/Avidin assay and the synthesis of isoporous membranes.

References

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