Protein immobilization on highly functional polymer grafted polyHIPEs

F. Audouin[a], *R. Larragy*[b], *B. O'Connor*[b], *A. Heise*[a]

[a] School of Chemical Sciences, Dublin City University, Glasnevin, Dublin 9, Ireland
[b] Irish Separation Science Cluster, Dublin City University, Glasnevin, Dublin 9, Ireland
Fabrice.audouin@dcu.ie

PolyHIPE have proven to be useful in a large variety of applications included column filtration/separation, supported organic chemistry, as media for tissue engineering and 3D cell culture.[1] We developed a new pHIPE platform by incorporation of a polymerizable monomer with amino group into the HIPE available for different post polymerizations.[2] The pHIPE with amino groups on the surface (pHIPE-NH_2) can be directly used for the ring opening polymerization of amino acids N-carboxyanhydrates (NCAs) to obtain pHIPE-*g*-polypeptides or easily converted to an atom transfer radical polymerization (ATRP) initiator for activators generated electron transfer (AGET) ATRP of *tert*-butyl acrylate. The polymers grafted were deprotected to form or pHIPE-*g*-poly(acrylic acid) with reactive groups on the surface of the pHIPE, available for bioconjugation of fluorescent proteins such as enhanced green fluorescent protein (eGFP).[3]

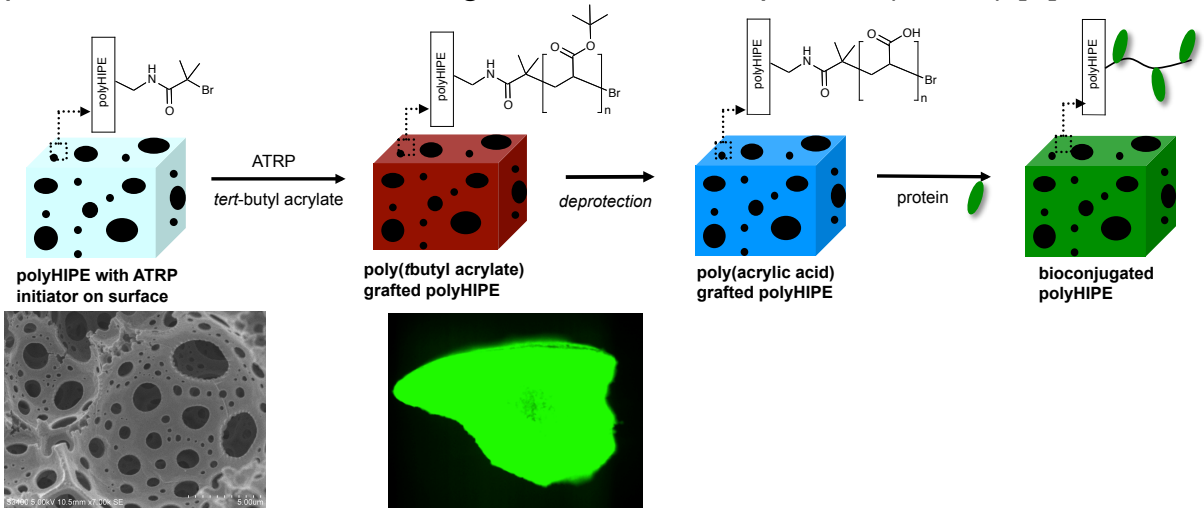

Figure 1: Top: Grafting of polyacrylic acid (PAA) from porous polyHIPE. Bottom: SEM image of PAA functional polyHIPE and fluorescence optical microscopy picture of polyHIPE conjugated with green fluorescent protein.

[1] S. D. Kimmins, N. R. Cameron, *Adv. Funct. Mater.* **2011**, 21, 211.
[2] F. Audouin, M. Fox, R. Larragy, P. Clarke, J. Huang, B. O'Connor, A. Heise, *Macromolecules* **2012**, 45, 6127.
[3] F. Audouin, R. Larragy, M. Fox, B. O'Connor, A. Heise, *Biomacromolecules* **2012**, 13, 3787.