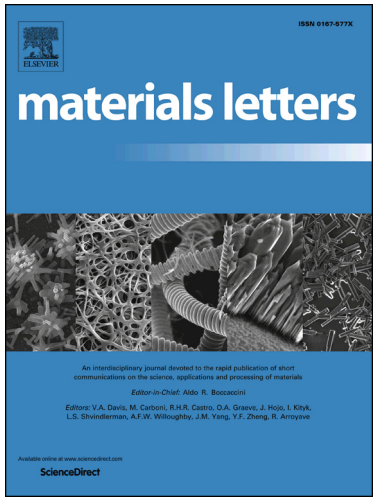

Fast synthesis of poly(ethylene glycol) diacrylate cryogels via UV irradiation

Marta Madaghiele, Luca Salvatore, Christian Demitri, Alessandro Sannino

PII: S0167-577X(18)30254-4
DOI: https://doi.org/10.1016/j.matlet.2018.02.048
Reference: MLBLUE 23874

To appear in: *Materials Letters*

Received Date: 8 January 2018
Revised Date: 2 February 2018
Accepted Date: 11 February 2018

Please cite this article as: M. Madaghiele, L. Salvatore, C. Demitri, A. Sannino, Fast synthesis of poly(ethylene glycol) diacrylate cryogels via UV irradiation, *Materials Letters* (2018), doi: https://doi.org/10.1016/j.matlet.2018.02.048

Fast synthesis of poly(ethylene glycol) diacrylate cryogels via UV irradiation

Marta Madaghiele[1*], Luca Salvatore[1], Christian Demitri[1], Alessandro Sannino[1]

[1]Department of Engineering for Innovation, University of Salento, Via per Monteroni, Lecce 73100, Italy

*Corresponding author: marta.madaghiele@unisalento.it

ABSTRACT

Poly(ethylene glycol) diacrylate (PEGDA) cryogels, particularly useful for biotechnological applications, are currently fabricated exploiting crosslinking systems that require long freezing/crosslinking times (20 hours or longer). The aim of this work was to assess whether fast UV irradiation (up to 60 seconds) of frozen PEGDA solutions could be an advantageous alternative for cryogel production. By using different polymer concentrations and UV times, cryogels with highly interconnected macropores (about 50-90 μm) were produced. A gelation yield in the range 60-80% was recorded, with higher values obtained for low PEGDA concentrations (5 and 10% w/v). Interestingly, while decreasing the swelling and increasing the stiffness of the cryogels, a higher polymer concentration was also found to reduce the pore size. Furthermore, increasing the UV time resulted in significantly higher swelling and larger pores for 10% PEGDA samples, while having negligible effect on other cryogel types and/or features. Although deserving further exploration, fast UV irradiation is an effective method to produce PEGDA cryogels with tunable properties.

Keywords: biomaterials; porous materials; cryogel; stiffness