Didem Aycan et al., J Chem Eng Process Technol 2018, Volume 9
DOI: 10.4172/2157-7048-C1-011

Fabrication of reduced graphene oxide-based conductive film for controlled drug delivery applications

Didem Aycan*, Neslihan Alemdar
Marmara University, TURKEY

Nowadays, conductive polymeric materials have been researched extensively and showed great potential for biomedical applications due to the unique properties such as cost effectiveness, strong biomolecular interactions, electrochemical and oxidative stability. They have been widely used in drug delivery systems, biosensors, tissue engineering scaffolds, and neural implants, since their conductive nature allows the stimulation of cells cultured upon them through the application of electrical signal. In this context, novel composite film composed of biopolymers and conductive inorganic additives such as graphene (G), graphene oxide (GO), and reduced graphene oxide (RGO) has been especially preferred owing to some advantages including high electric conductivity at room temperature, excellent mechanical flexibility, long term environmental stability, good electrochemical activity, biocompatibility of biopolymers and also brilliant chemical properties. Herein, RGO-based conductive films were fabricated by incorporation of different amount of RGO into the polymeric network which contains gelatin (Gel), sodium alginate (SA) and hyaluronic acid (HyA) by using a solvent-casting method. The obtained polymeric films were loaded with a model drug and the release kinetic of the drug from the composite film was investigated under the different voltage values. The obtained results assured that RGO-based conductive films could be used as an electro-responsive drug carrier in the future applications.

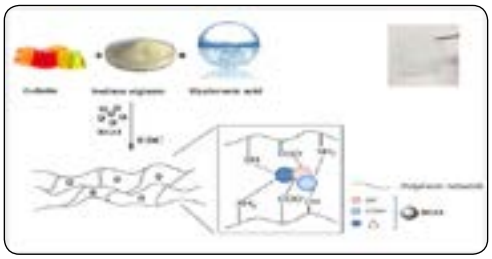

Figure 1. Figure: Schematic diagram of fabrication of RGO-based composite film

Recent Publications:

1. Aycan D., Alemdar N. (2018) Development of pH-Responsive Chitosan-Based Hydrogel Modified with Bone Ash for Controlled Release of Amoxicillin. Carbohydrate Polymers 184:401-407.
2. Aycan D., Alemdar N. (2017) Production Of pH-Stimuli Responsive Hydrogel for Treatment of Gastric Ulcer. Advanced Polymers via Macromolecular Engineering (APME 2017).
3. Aycan D., Alemdar N. (2017) Fabrication of Bone Ash-Reinforced Smart Hydrogel with Enhanced Mechanical and Thermal Performance. European Polymer Federation Congress (EPF 2017).
4. Alemdar N., Uluturk C., Aycan D., Akyuz D., Koca A., Albayrak F.K. (2017) PANI-Based Hydrogel For Glucose Sensıng. International Conference on Applications in Chemistry and Chemical Engineering (ICACCHE 2017).
5. Aycan D., Alemdar N (2016) Chitosan-Based Hydrogel with A High Water Uptake Capacity for Biomedical Applications. 80th Prague Meetings on Macromolecules, Self-assembly in the world of polymers.

Biography

Didem Aycan is currently Ph.D. student in the Department of Chemical Engineering at Marmara University, Istanbul, Turkey. Aycan received her Bachelor Degree from Hacettepe University in Chemical Engineering in 2013 and received her Master Degree from Istanbul Technical University in Chemical Engineering in 2016. During 2013–2016, she worked as a Research Assistant at Istanbul Technical University at Chemical Engineering Department. Her research interests are focused on the synthesis of smart polymers and conductive polymers, their characterizations and its application for drug delivery systems, biosensor and tissue engineering applications and also oil-based film production for coating applications.

didem.aycan@marmara.edu.tr