18 September 2023

Editor,

Journal of Polymer Science and Engineering

Dear Editor,

I would like to submit our manuscript titled **“Polymer Gel Amended Sandy Soil with Enhanced Water Storage and Extended Release Capabilities for Sustainable Desert Agriculture”** by *Mohan Raj Krishnan, and Edreese Alsharaeh* for consideration to publish in *Journal of Polymer Science and Engineering*.

Herein, we report a facile preparation of super-hydrophilic sand by coating the sand particles with cross-linked polyacrylamide (PAM) hydrogels for enhanced water absorption and controlled water release aimed at desert agriculture. To prepare the sample, 4 wt% of aqueous PAM solution is mixed with organic cross-linkers of hydroquinone (HQ) and hexamethylenetetramine (HMT) in 1:1 weight ratio and aqueous potassium chloride (KCl) solution. A specific amount of the above solution is added to the sand well mixed and subsequently cured at 150oC for 8 hours. The prepared super-hydrophilic sands were characterized by Fourier-transform infrared spectroscopy (FT-IR) for chemical composition and X-ray diffraction (XRD) for successful polymer coating onto the sand. The water storage for the samples was studied by absorption kinetics at various temperature conditions and extended water release was studied by the water desorption kinetics. The water swelling ratio for the super-hydrophilic sand has reached a maximum of 900% at 80oC within 1 hour. The desorption kinetics of the samples showed that the water can be stored up to a maximum of 3 days. Therefore, super-hydrophilic sand particles were successfully prepared by coating with PAM hydrogels with a great potential to be used in sustainable desert agriculture..

This manuscript has not been published and is not under consideration for publication elsewhere.

We have no conflicts of interest to disclose. Thank you for your consideration. I look forward to hearing from you.

Sincerely,

Mohan Raj Krishnan

Mohan Raj Krishnan, Ph.D. Faculty Member, Dept. of Chemistry

Alfaisal University Al Maathar Road, Box 50927,

Riyadh 11533, Kingdom of Saudi Arabia. Tel. (+966 51) 0126-445;

E-Mail: [mkrishnan@alfaisal.edu](mailto:mkrishnan@alfaisal.edu)