Lyndsay Troyer, Ph.D.
Science Editor
Journal of Visualized Experiments

January 23, 2019

Dear Dr. Troyer:

Please find enclosed our manuscript entitled "Removal of Arsenic using a Cationic Polymer Gel Impregnated with Iron Hydroxide", which we would like to submit for publication as a video article in Journal of Visualized Experiments (JoVE).

Arsenic is a lethal contaminant of groundwater and industrial wastewater, which has direct negative effects on public health. Treatment processes to remove arsenic are urgently needed. Although, many researchers have developed adsorbents to remove arsenic, they are not effective in natural conditions, because of a lack of selectivity. Moreover, these adsorbents lack process simplicity and cost effectiveness. Our objective is to develop an adsorbent, a cationic polymer gel loaded with iron hydroxide, which can effectively adsorb arsenic, provide selectivity and simplify production processes. The gel is also cost-effective and reusable. In this paper, we discussed the unique preparation method of the gel composite. The uniqueness is that, we added $FeCl_3$ in the middle of the synthesis of the gel so as to ensure maximum content of FeOOH inside the gel structure. We found that the gel performs effectively at natural pH levels. Also, we examined the adsorption reaction kinetics. The arsenic adsorption isotherm of the gel was also discussed, and it matched well with Langmuir isotherm. We found the maximum adsorption capacity of arsenic adsorption by our gel is higher than the other methods. In addition, one of our objectives was to examine the selectivity of arsenic adsorption by the gel. According to the Hofmeister series, Sulphate ion precedes the other ions because of its ability to penetrate the headgroup region of the monolayer and thereby disrupting the hydrocarbon packing. Therefore, we examined the selective adsorption of arsenic in the presence of Sulphate ion. We found that, the gel's performance does not deviate even if high concentration of Sulphate is present in water. Hence, the gel can adsorb arsenic selectively from natural water. In addition, the regeneration process in this study is different than the other studies because, for the desorption process, NaOH is most commonly used. But, we used NaCl for desorbing arsenic because of the harmfulness of NaOH. And the regeneration process was continued for eight consecutive days successfully. This information will be of immediate interest to researchers investigating the treatment processes to remove arsenic from water sources. We believe that JoVE is the best platform to share our results with the viewers.

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Please address all correspondence to: tgoto@hiroshima-u.ac.jp. We look forward to hearing from you at your earliest convenience.

Yours sincerely,
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