

catalysts

Ms. Ref. No.: catalysts-1584262

Title: Bio-stimulated adsorption of Cr(VI) from aqueous solution by Groundnut Shell Activated Carbon@Al embedded material

Response to Reviewer-2 Comments

We appreciate the efforts of the reviewers for their detailed and insightful comments, which have helped us to improve the quality of our manuscript. A point-by-point response to the reviewer-2 comments is appended below for your convenience.

Comment 1: The issue of regeneration has not been sufficiently worked out, but the authors themselves write about this, and it is not clear why NaOH was used for this.

Response: We acknowledge the reviewer's opinion. Based on the reviewer suggestion, regeneration studies were performed briefly. Four different desorption agents such as tap water, 0.1M HCl, 0.1M H₂SO₄ and 0.1M NaOH were utilized to remove the adsorbed chromium ions from the Al-GNSC adsorbent. From this various desorption agents it was identified that 0.1M NaOH was more effective. Hence, the reuse of Al-GNSC from Cr(VI)-loaded material was studied for sorption and desorption cycles using sodium hydroxide as a regenerated agent. Thank you for your valuable suggestion.

Relevant references are quoted in the revised manuscript.

Reference: Sujitha Ravulapalli and Ravindhranath Kunta reported that sodium hydroxide was used as a regenerating agent for the sorption and desorption of Cr(VI) by activated carbon derived from *Lantana camara* plant. [Enhanced removal of chromium (VI) from wastewater using active carbon derived from *Lantana camara* plant as adsorbent. **Water Sci Technol** (2018) **78** (6): 1377–1389. <https://doi.org/10.2166/wst.2018.413>]

Reference: M.A. Tandal and B.N.OZA. reported that Sodium hydroxide as a regenerating agent for the sorption and desorption of Cr(VI) by Granular activated carbon. [Adsorption and regeneration studies for the removal of Chromium (VI) from the waste water of electroplating industry using Granular activated carbon. **Asian Journal of chemistry**. Vol. 17, No.4 (2005), 2524-2530]

Comment 2: It was also not clear to me how much hydrochloric acid was eventually added during the preparation of the adsorbent.

Response: We acknowledge the reviewer's opinion. For the preparation of 1kg of Al-GNSC adsorbent, approximately 150 to 200 mL of hydrochloric acid was added in order to blend the aluminum in to the ground nut shell carbon. Thank you for your valuable comment.

Comment 3: The authors did not indicate how the "separation factor 'R_L' is calculated and did not give a link to the equation for its calculation, and if the readers are not quite in the subject, then what kind of factor they do not understand.

Response: We acknowledge the reviewer's opinion. According to the reviewer suggestion, the expression of separation factor is mentioned in the revised manuscript.

$$R_L = \frac{1}{1+bC_i}$$
, where "C_i" is the initial concentration of Cr(VI) and "b" is the Langmuir constant. Thank you for your valuable comment.

Comment 4: One could also estimate the specific surface area and porosity. So, the paper can be published after revision.

Response: We acknowledge the reviewer's opinion. We acknowledge the reviewer's opinion. However, we regret that we were not able to investigate the BET analysis due to pandemic situation, which could definitely give us additional information. We hope the reviewer understand the experimental deficiencies at the stage of the present experiments. We deeply appreciate the comment raised by the reviewer. Thank you very much.

The authors are very thankful to the Reviewer for their valuable suggestions for the improvement of the manuscript.

All the modifications are shown in yellow color in the revised manuscript.

With regards

Ravindranadh Koutavarapu, Ph.D.