Response to Reviewer’s comments

for

**Transport of surface-modified carbon nanotubes through a soil column**

By Prabhakar Sharma and Fritjof Fagerlund

Please find the comments in *italics* and response in **bold** face.

*1. Please take this opportunity to thoroughly proofread the manuscript to ensure that there are no spelling or grammar issues. The JoVE editor will not copy-edit your manuscript and any errors in the submitted revision may be present in the published version.*

**Response: We have proof-read the paper after considering all the comments.**

*2. Please highlight 2.75 pages or less of the Protocol (including headings and spacing) that identifies the essential steps of the protocol for the video, i.e., the steps that should be visualized to tell the most cohesive story of the Protocol. The highlighted steps should form a cohesive narrative with a logical flow from one highlighted step to the next. Remember that non-highlighted Protocol steps will remain in the manuscript, and therefore will still be available to the reader. There are currently 3.25 pages of highlighted protocol text.*

**Response: We have edited the protocol section to consider the reviewer’s comments and kept the highlighted part for video recording within 2.75 pages.**

*3. Please revise the Short Abstract. It is a 50 word run-on-sentence that needs to be re-written more clearly.*

**Response: We have revised the short abstract.**

**Reviewers' comments:**

**Reviewer #1:**

*1) How did author characterize functionalize CNT? What are the functional groups observed?*

**Response: The functionalized MWCNT was visualized using SEM in this paper (protocol 3.5.2 and 3.7.5) but it was excluded from video recording however the functional group was observed in literature (Mattison et al, 2011) using XPS analysis (mentioned in first paragraph of discussion part in line 358-260).**

*2) Authors need to explain about mass balance of CNT of column experiments.*

**Response: Mass balance of MWCNT retention in the column was commonly performed for column retention studies. We have not included the mass balance in this paper but it has been performed and discussed in more detail in Sharma et al 2014.**

*3) How does CNT goes to soil and groundwater? What is the expected concentration of CNT in groundwater?*

**Response: There are not many cases have been reported so far for the actual presence and concentration of CNTs in groundwater but it can likely be possible after improper handling of wide range of their products into landfill sites where they can find the way into groundwater or soil at extreme chemical scenario of the surrounding as discussed in first paragraph of Introduction.**

**Reviewer #2:**

***Editor’s Note:*** *We do not require in depth or novel results for publication in JoVE, only representative results that demonstrate the efficacy of the protocol. However, please ensure that all claims made throughout the manuscript are supported by either results or references to published works.*

*Opinion Summary: The novelty of the research in this paper is low. Sharma et al. (2014) already presents the effects of grain size and velocity on MWCNT transport. It is not clear if the same data is presented in this work. Kasel et al. (2013) also addressed the issues of grain size previously. The degree of MWCNT functionalization on transport is also well known (Nagasawa et al., 2000; Pumera, 2007; Xia et al., 2007; Smith et al., 2009; Mattison et al., 2011). I do not see any new insight in this work over previous publications.*

**Response: It is true that Sharma et al (2014) is the basis of this video paper for most of the research results but we wanted to present the method of functionalization of MWCNT and the basis of a column transport studies in this video demonstration. We want to focus the actual dissimilarities may occur in many similar studies as a result of functionalization process and column studies being followed in the laboratory studies (such as Nagasawa et al., 2000; Pumera, 2007; Xia et al., 2007; Smith et al., 2009; Liu et al., 2009; Mattison et al., 2011).**

*In addition, I expected to see "visualization" information in this research because of journal title, but did not see any visualization information on MWCNT aggregation or retention processes.*

**Response: There are two step verification for aggregation process performed in this study. We had analyzed the inflow and outflow of MWCNT solution in the column transport studies for change in their hydrodynamic diameter using zeta sizer and for change in their particle size through visualization process using SEM image analysis (protocol 3.5.2 and 3.7.5).**