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REVIEWER REPORT:

Communication, No. adma.201900136R1

Title: “Scanning Probe Lithography Patterning of Monolayer Semiconductors and Its Application for Quantifying Edge Recombination”

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We appreciate the reviewers for their time and insightful questions. Please find the responses to their comments below.

Reviewer #1:

The authors have revised their manuscript accordingly. It can be accepted as is.

Our response:

We would like to thank the reviewer for his/her insightful advice for improving our manuscript.

Reviewer #2:

The revised version of the manuscript addresses well the issues brought by the referees. The addition of the supporting data completes the work and the claims are now, for the large, part, well supported by the claims. In Equations 4,5, and 6 the definition of the dr and ds are still missing, and these should be defined by adding a sketch to the SI describing the geometry so the volume or surface over which the integral is evaluated is well defined. Upon this minor addition the manuscript will be suitable for publication. The initial assessment of the novelty of the work has not improved however, and based on the previous results in the field and from the same group, the impact of the current work is not convincingly high enough to warrant publication in Advanced materials. The work should be considered for a sister journal.

We thank the reviewer for his/her comment. We added the definition for those equations in the main text. The sketch regarding the definition of electrical field *E*, volume *v* and surface *s* has been added to Fig. S4.

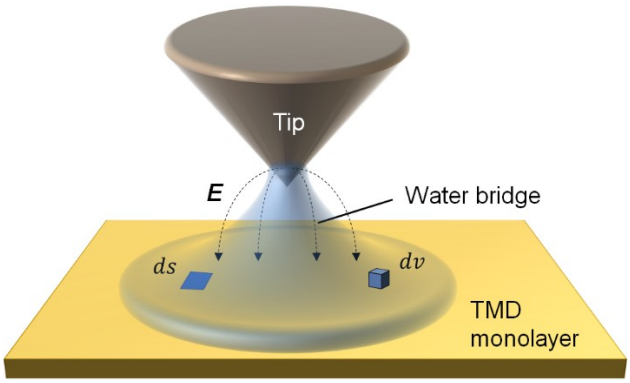

Figure S4. Illustration of the tip/TMD interface. *E* is the space-varying electrical field, *v* represents the volume of the condensed water, and *s* represents the surface area of the condensed water.

In regards to novelty, we believe that the work presents a major advance in the field as it tackles a fundamentally important and yet vaguely explored research topic in the field of monolayer devices. Specifically, for the first time, we have fabricated chemically benign edges using scanning probe lithography without any residual contamination from photoresist/etching processes, and we subsequently characterized (and quantified) the edge quality by measuring the edge recombination velocity for four different TMDC monolayers, with and without chemical treatment/passivation. All nanoscale devices must be patterned and thus exhibit large density of edge defects given that the edges are not self-terminated. This is a fundamentally

important problem that must be investigated by the community. The work here will fuel future research in this direction as it presents a platform to make chemically benign edges and quantify their quality.