Dear Editor,

We would like to submit our manuscript entitled “Developing High Performance GaP/Si Heterojunction Solar Cells” for publication in JoVE. This manuscript is the detailed methods of the paper published in the Journal of Materials Research (doi: 10.1557/jmr.2018.14).

In this paper, details are given for the growth, fabrication, and characterization of different n-GaP/n-Si heterojunction solar cells to explore the effect of GaP as a carrier-selective contact. The a-Si/n-Si/n-GaP solar cell shows a high Si bulk lifetime (~2.2 ms at the injection level of 1015 cm-3) and open-circuit voltage of 618 mV and efficiency of 13.1%. In addition to GaP as an electron-selective contact, a MoOx layer was successfully implemented as a hole-selective contact in the n-Si/n-GaP heterojunction solar cell, increasing efficiency to 14.1% by improving the short wavelength response. The general problem of Si bulk lifetime degradation during growth of III-V compounds on Si by molecular beam epitaxy (MBE) was also investigated, and two different approaches to preserve minority-carrier lifetime and their effects on GaP/Si solar cell performance are presented.

We confirm that this manuscript is original and has not been published elsewhere and it is not under consideration by another journal. All authors have approved the manuscript and agree with submission to JoVE.

Thank you for your consideration, and I look forward to receiving your comments.

Sincerely,

Chaomin