Dear editor and reviewer:

We are grateful to the editor and reviewers for their constructive comments and suggestions on the revision of the manuscript. We have made all the necessary changes again as suggested by the editor and reviewers. All the revisions in the manuscript and the supporting information have been highlighted in underline.

Reviewer #4:

Comment 1: Authors should summarize the possible methodology for surface polishing process with clear advantageous.

Respond: Thank you very much for your comment. We made the following additions in the article:

The polishing of optical components is commonly divided into three kinds. The traditional polishing method belongs to the cold working method of glass. The polishing machine uses a friction wheel to rotate, the spindle speed is low, and the plane swing tripod is used to apply pressure, and the pressure is adjusted by the load weight. The main advantages are that the precision requirements of the polishing machine are low, the replacement rate of the polishing mold is high, and the equipment investment cost is small. The main disadvantage is the low production efficiency. The chemical mechanical polishing method is a polishing method that combines chemical operation and mechanical action. First, the workpiece surface material reacts chemically with the oxidant, catalyst, in the polishing liquid to form a soft layer that is relatively easy to remove. Which mainly remove the roughness of the surface, get the average number of microns to tens of microns of finish. It is exposed again, and then the chemical reaction is carried out, so that the surface polishing of the workpiece is completed in the alternating process of chemical action and mechanical action. This avoids the surface damage caused by simple

mechanical polishing and the disadvantages of slow polishing speed, poor surface flatness and polishing consistency that are easily caused by simple chemical polishing. The magnetorheological polishing method is a flexible "small grinding head" with viscoplastic behavior formed by the rheology of the magnetorheological polishing liquid in a gradient magnetic field and the workpiece has a rapid relative motion, so that the surface of the workpiece is greatly affected. Shearing force, so that the workpiece surface material is removed. The method is suitable for polishing optical parts of any geometric shape, with high processing speed, high efficiency, high processing precision, and the processed surface roughness can reach nanometer level [24-27].

Comment 2: Should discuss the corrosion/fracture development and their low impact during the polishing.

Respond: Thank you very much for your comment. We have made a supplementary explanation in comment 1, as follows

The chemical mechanical polishing method is a polishing method that combines chemical operation and mechanical action. First, the workpiece surface material reacts chemically with the oxidant, catalyst, in the polishing liquid to form a soft layer that is relatively easy to remove. Which mainly remove the roughness of the surface, get the average number of microns to tens of microns of finish. It is exposed again, and then the chemical reaction is carried out, so that the surface polishing of the workpiece is completed in the alternating process of chemical action and mechanical action. This avoids the surface damage caused by simple mechanical polishing and the disadvantages of slow polishing speed, poor surface flatness and polishing consistency that are easily caused by simple chemical polishing.

Comment 3: The recent findings should be discussed with valuable points in the introduction section.

Respond: Thank you very much for your comment. We have made supplementary notes and introduced relevant references in the manuscript, as follows:

In the process of grinding and polishing of optical components, a large number of defects and other precursors may be generated in the sub-surface defect layer. The detection methods of these damage precursors, the relationship between them and the damage, and how to suppress them are lack of relevant technical reports. On the other hand, due to the lack of effective damage precursor characterization methods, there is relatively little research on the correlation between damage precursor and damage in high-energy laser systems. Therefore, it is of great significance to develop a comprehensive damage precursor detection system for different damage precursor types [21-27]. The main objective of this study is to investigate the surface quality of single crystal silicon optics fabricated with different polishing processes through laser-induced SC imaging and photothermal weak absorption imaging techniques

Thank you for your attention and patience, we hope the editors will take a second look at the work we're doing.

Yours sincerely.

Xin Ye