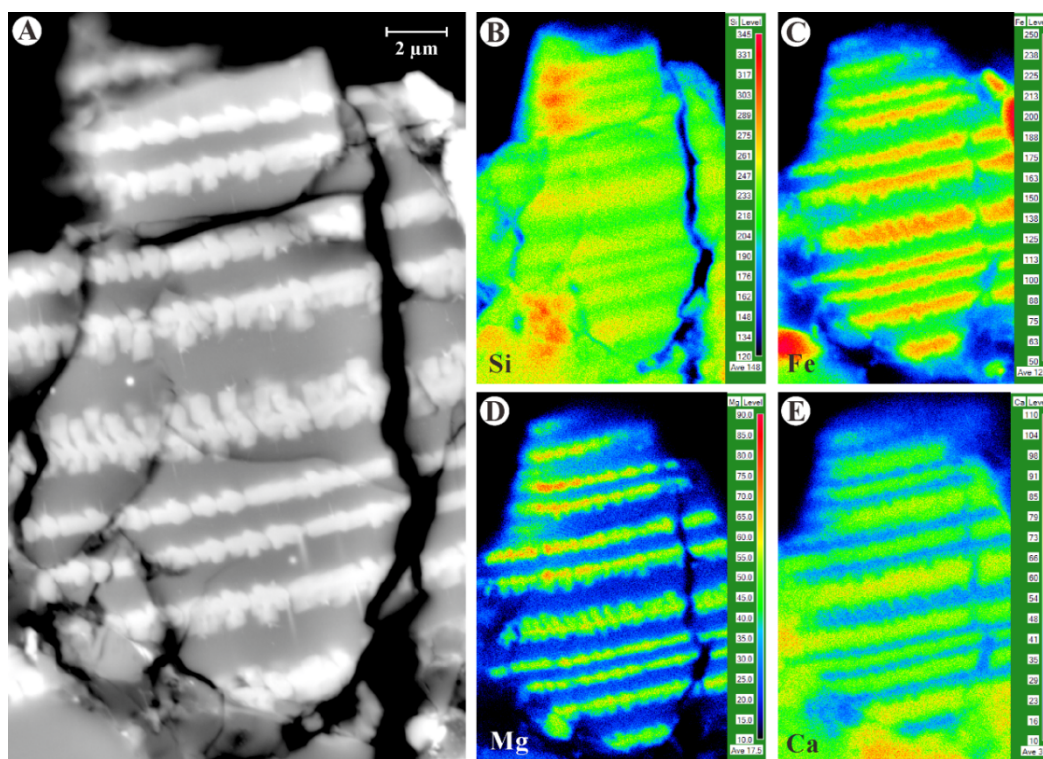
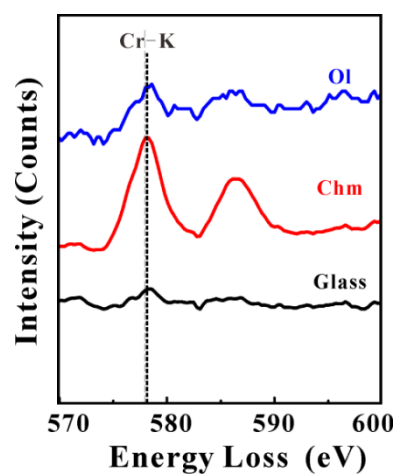


## Supplementary Materials

### Supplementary Figures

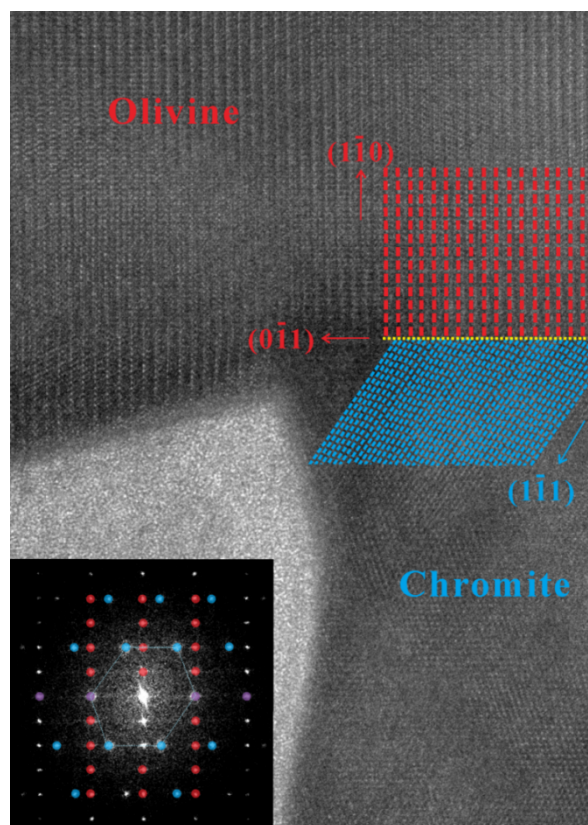


**Figure S1.** The element distributions of Si, Fe, Mg, and Ca in the sample. (A) SEM image of the sample with olivine bonds, whisker structure and glass. (B), (C), (D), and (E) are the distribution patterns of Si, Fe, Mg, and Ca , respectively.



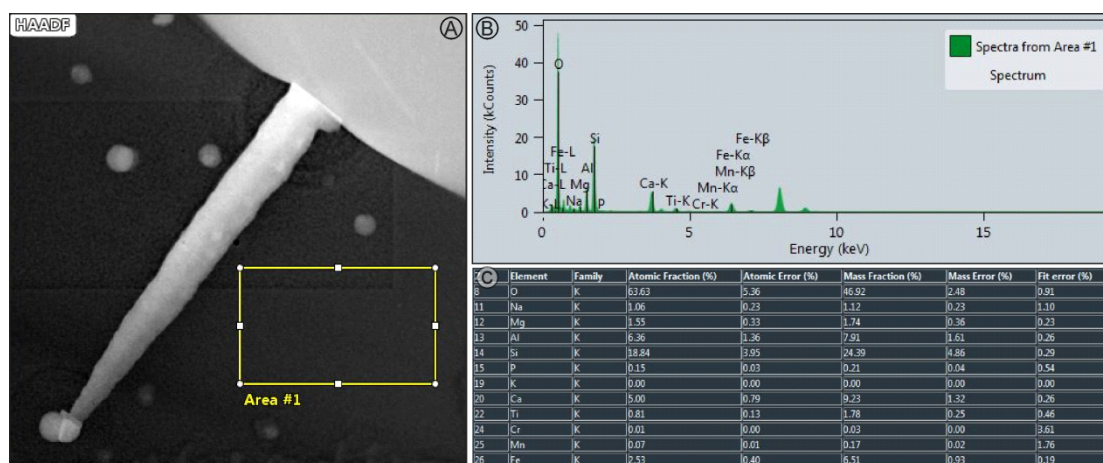
**Figure S2. Cr-K peaks in EELS spectra of olivine (Ol), chromite (Chm) and glass.**

The different shape and intensities correspond to various Cr concentrations.



**Figure S3. HRTEM image displaying the interface between olivine and chromite.**

Red lines represent for the crystal lattice of olivine and blue lines for crystal lattice of chromite, while the arrows represent their crystal orientation. The inserted Fast Fourier Transform image shows the diffraction spots of olivine (red spots) and those of chromite (blue spots), as well as their overlapped spots (purple spots) along the  $[100]$  zone axis of two minerals.



**Figure S4. Composition of the glass acquired from EDS results. (A)**HAADF image of the mushroom-like structure and surrounding glass. **(B)** EDS spectra of the pure glass, acquired from the framed area in (a). **(C)** Corresponding quantitative results of spectra in (b).