

Figure S1 Scatter plot after PCA of the XANES spectra in the pigmented area of (a) GZ01(1 cluster) ; (b) GZ-BD01 (1 cluster); (c) HZ-BD01 (2 clusters); (d) HZ-BD02 (2 clusters); (e) TGD-BD04 (1 cluster); (f) TGD-BD06 (2 clusters); (g) TGD-BD08 (1 cluster); (h) TGD-BD14 (1 cluster)

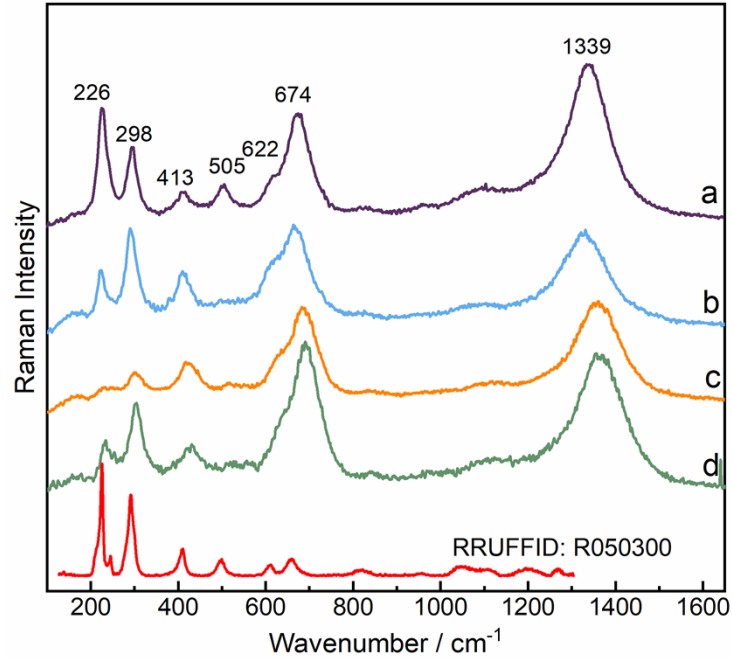


Figure S2 Raman spectra collected on pigment areas of (a) TGD-BD04; (b) TGD-BD06; (c) HZ-BD01; (d) HZ-BD02. RRUFFID: R050300 is the reference.

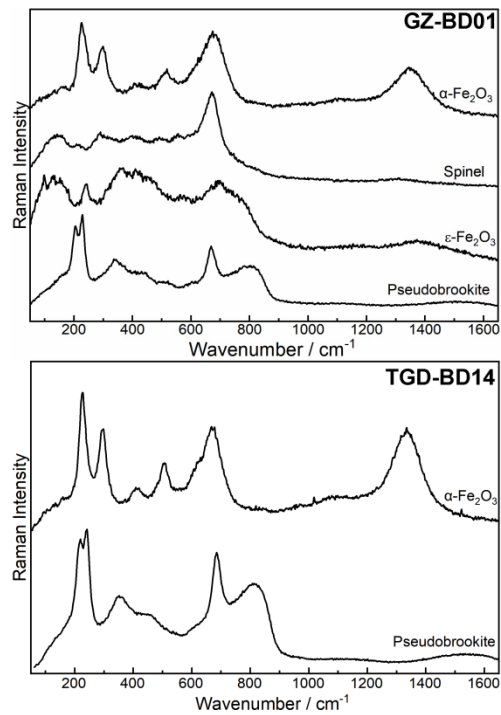


Figure S3 Raman spectra of iron crystals collected in the pigment layer of GZ-BD01 and TGD-BD14.

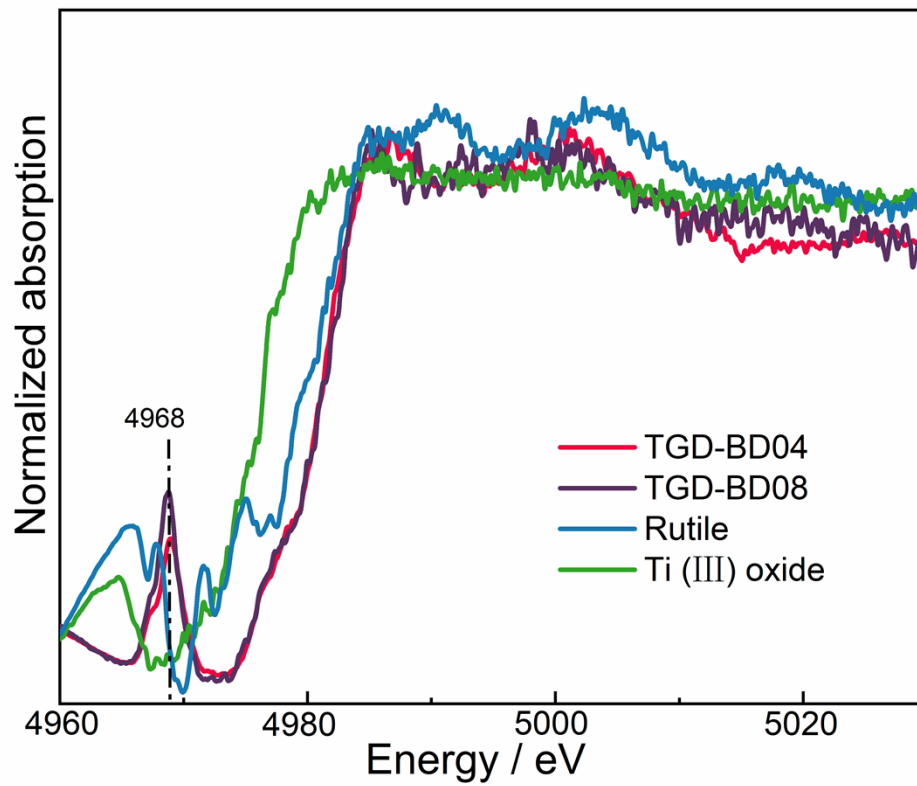


Figure S4 Ti-K-edge XANES spectra of glassy matrix above the pigment layer in TGD-BD04 and TGD-BD08