

Supplementary Material

Mapping the redox state of the young Solar System using ytterbium valence state

by

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S1: Scanning electron images (backscattered electrons) of oldhamite in enstatite chondrites. The schematic drawing in the top-left corner represents the polished section with the location of the SEM images indicated. Green crosses with red labels point to chemical analysis (EDS) positions, used to identify the minerals. Red arrows point to oldhamite grains, which were analyzed by XANES. In the case of Adrar Bous, all analyzed grains are oldhamite crystals.

Fig S1_a: Enstatite chondrite Sahara 97158 (EH3)

Fig S1_b: Enstatite chondrite Abee (EH4-IMB)

Fig S1_c: Enstatite chondrite Adrar Bous (EL5)

Fig S1_a:
Sahara 97158 (EH3)

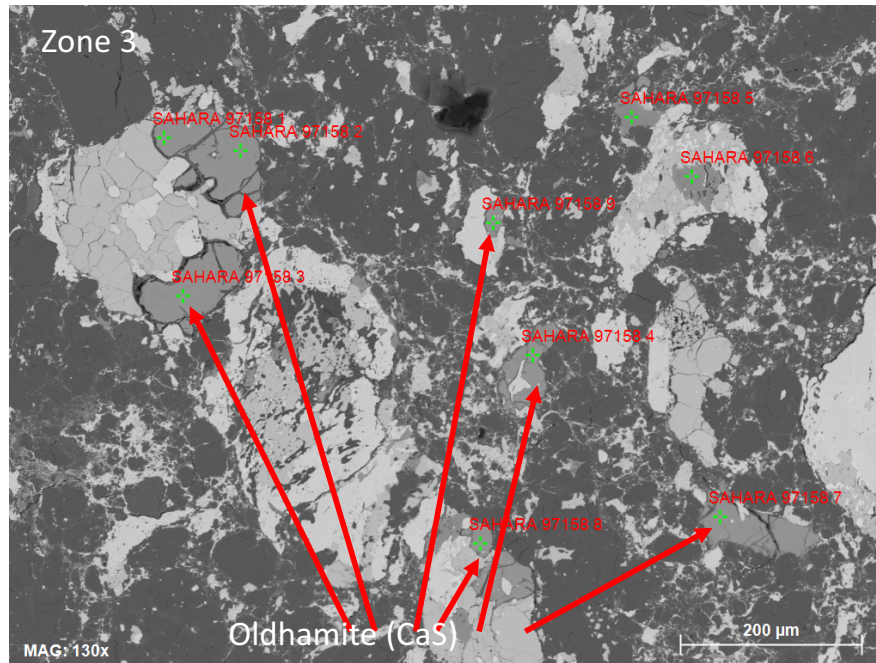
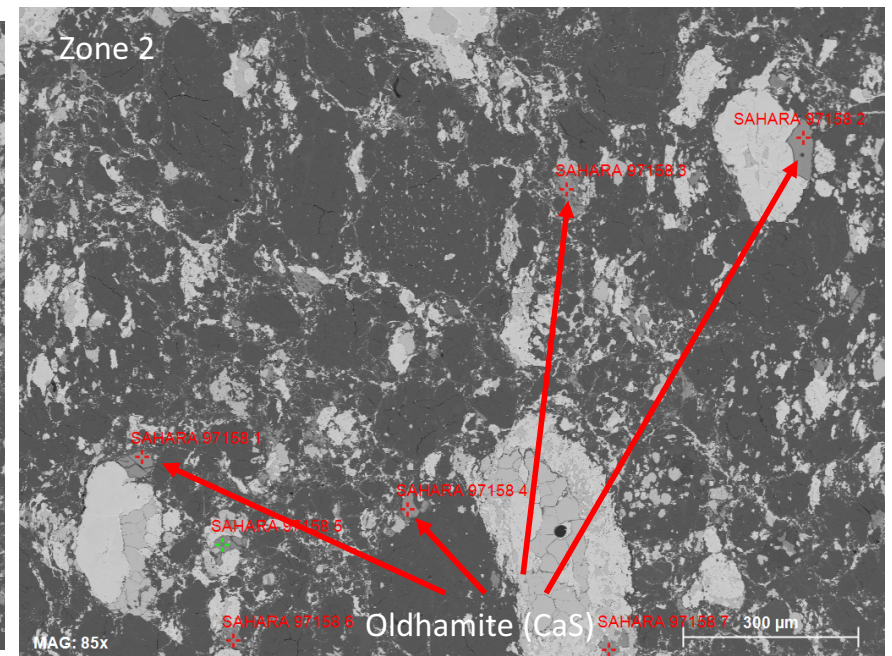
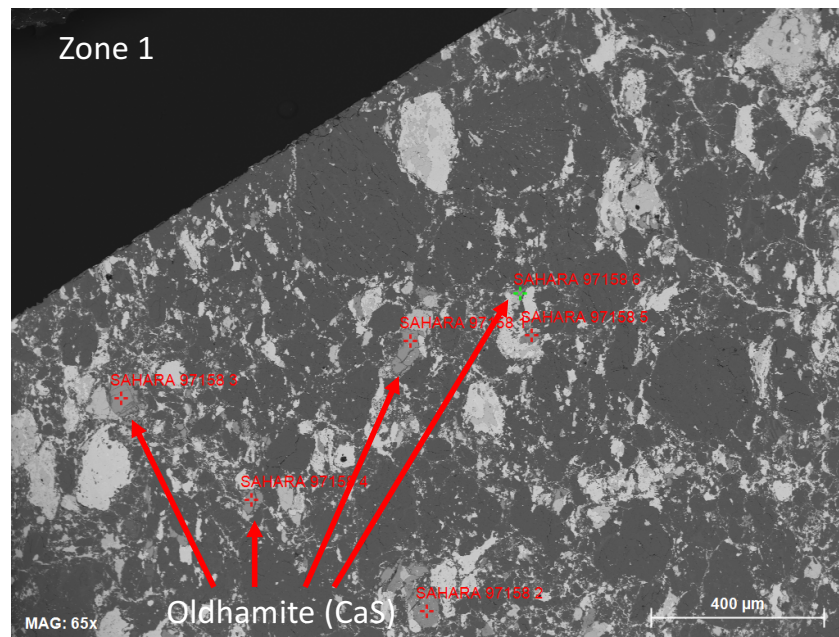
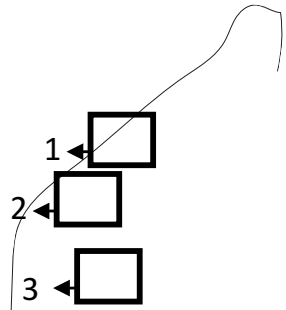


Fig S1_bAbee (EH4)

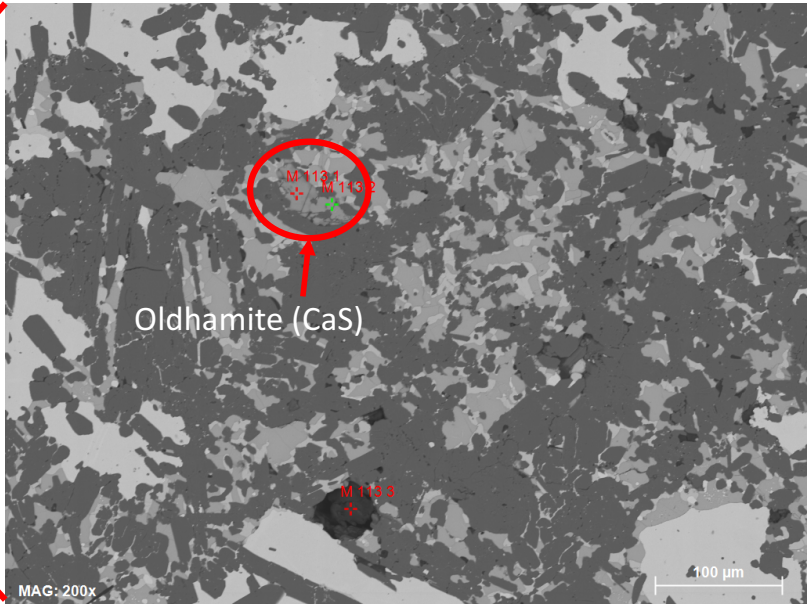
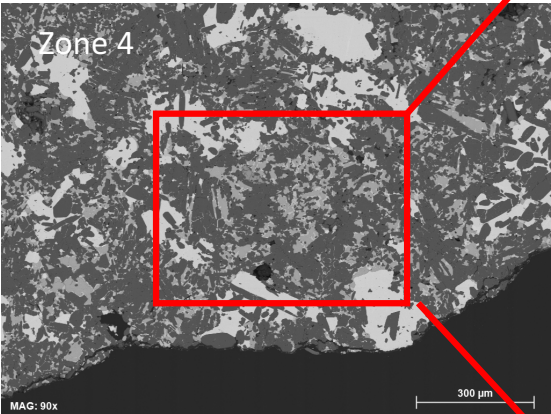
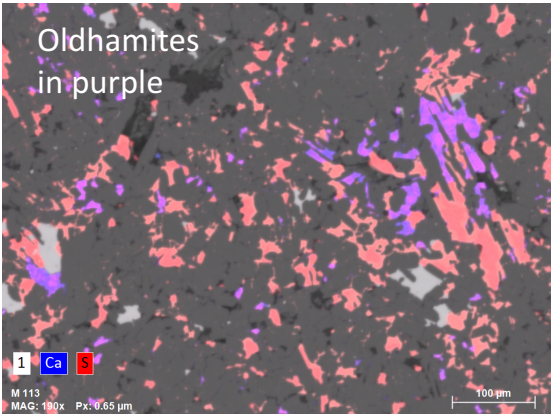
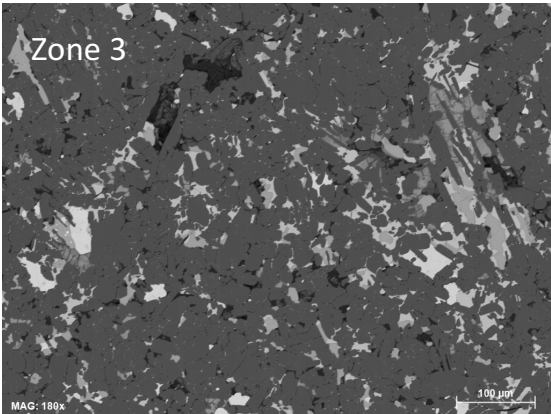
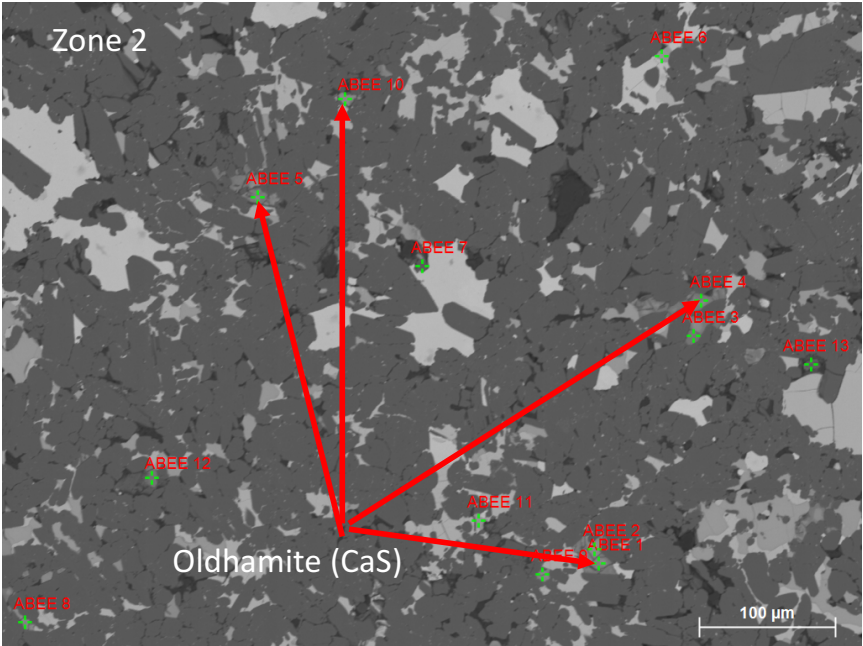
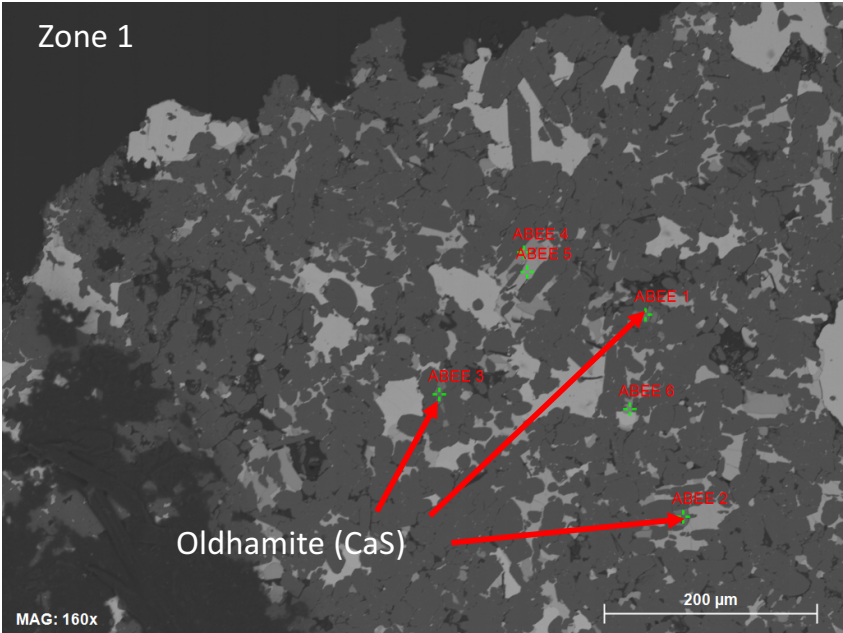
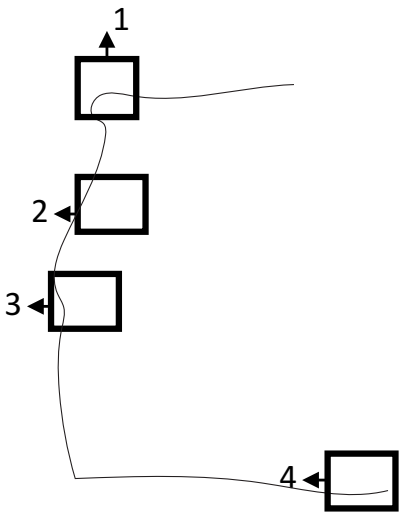
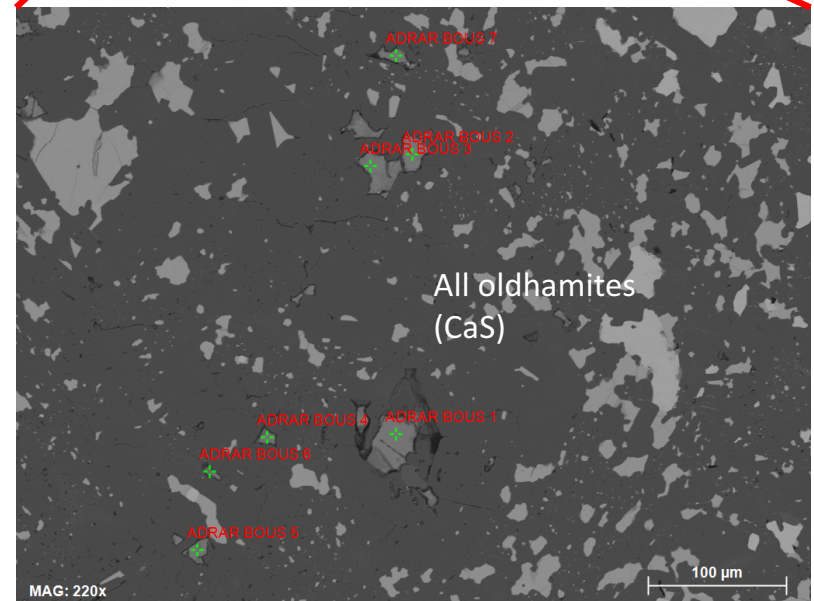
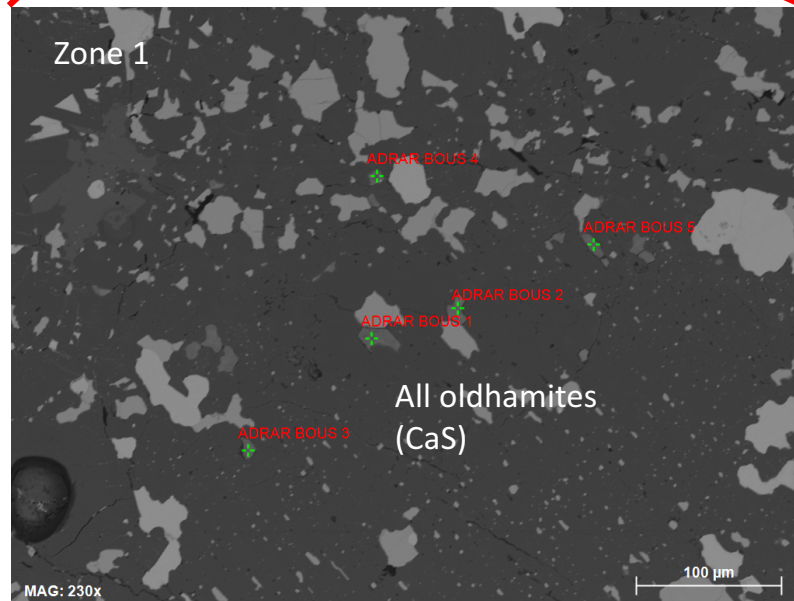
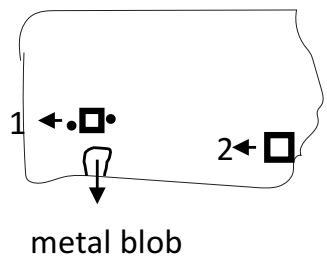


Fig S1_c: Adrar Bous (EL5)



S2: Individual Yb L2-edge absorption edge spectra for the analyzed meteorites

Fig S2_a: Ordinary chondrites Kernouvé and St-Séverin

Fig S2_b: Enstatite chondrite Sahara 97158 (EH3)

Fig S2_c: Enstatite chondrite Oudiyat Sbaa 97158 (EH5)

Fig S2_d: Enstatite chondrite MS189 (EL3)

Fig S2_e: Enstatite chondrite MS196 (EL4/5)

Fig S2_f: Enstatite chondrite Adrar Bous (EL5)

Fig S2_g: Enstatite chondrite Hvittis (EL6)

Fig S2_h: Eucrite NWA 15965

Fig S2_i: Pallasite Seychan

Fig S2_j: Ungrouped achondrite NWA 11119

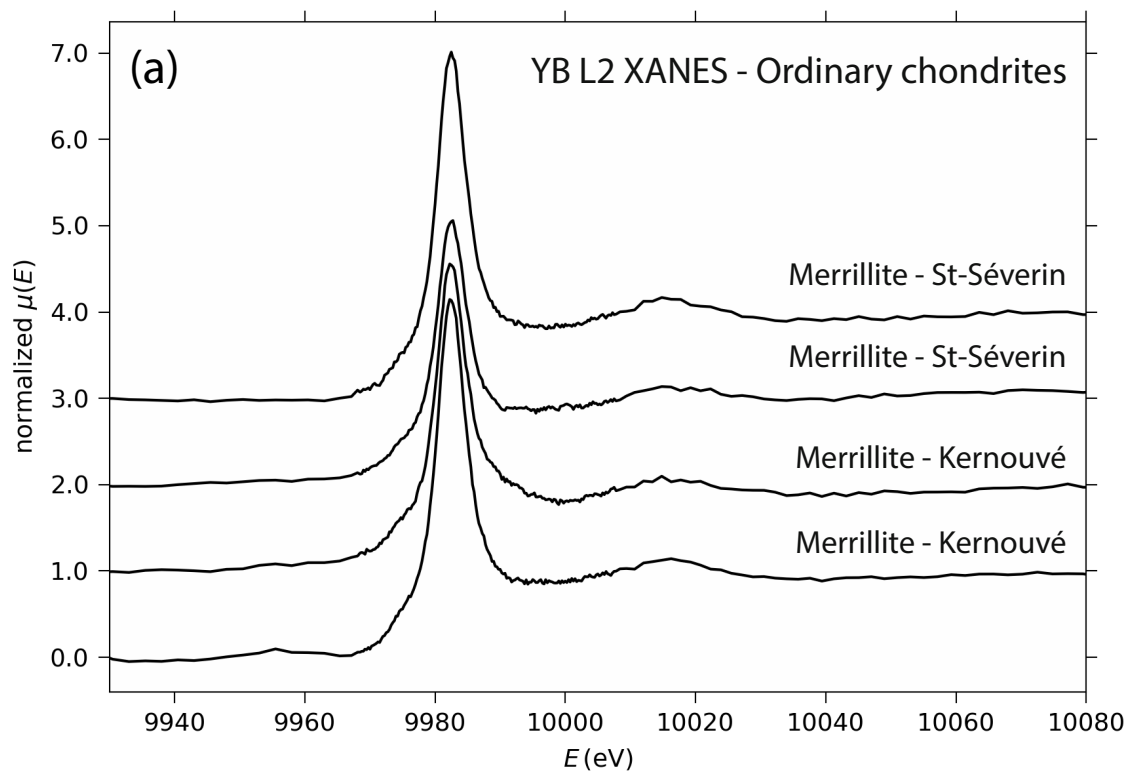


Fig S2_a

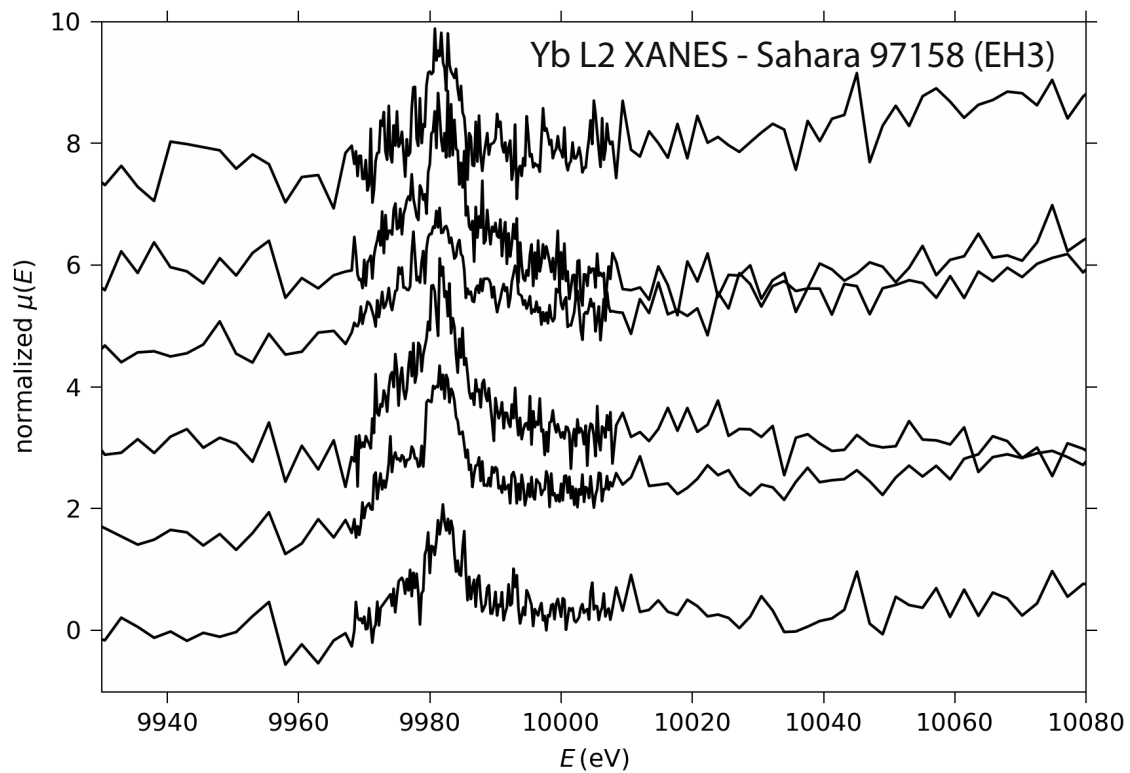


Fig S2_b

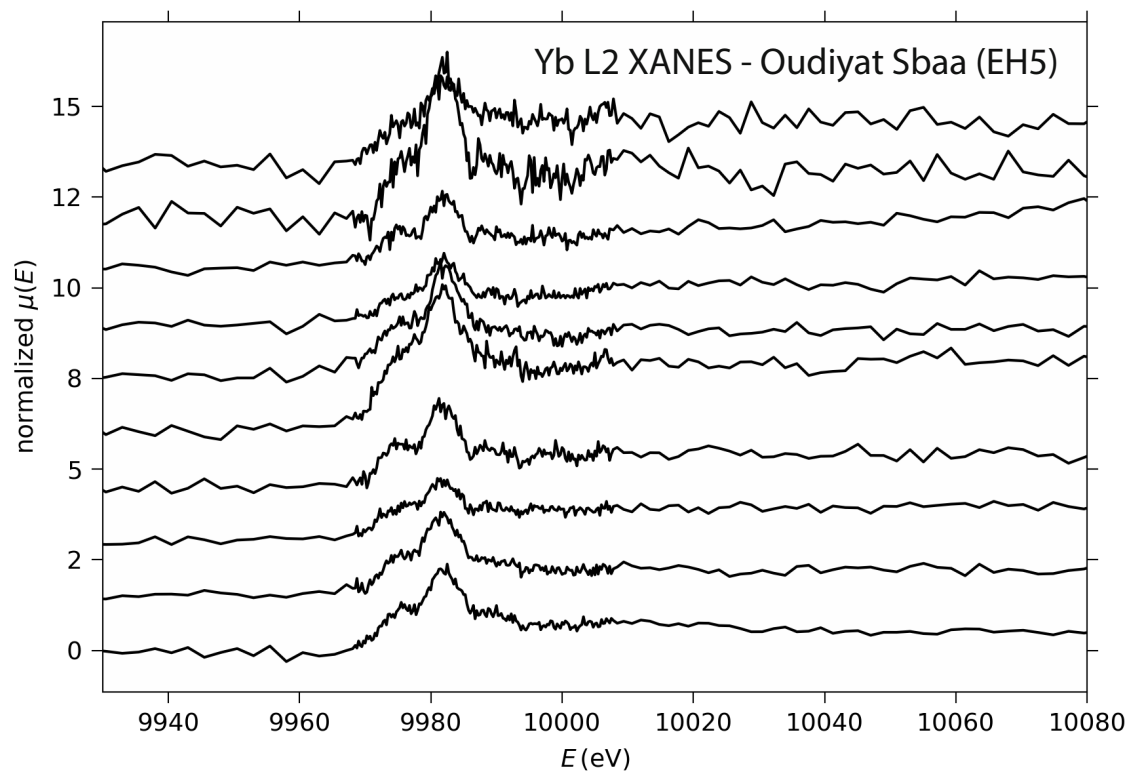


Fig S2_c

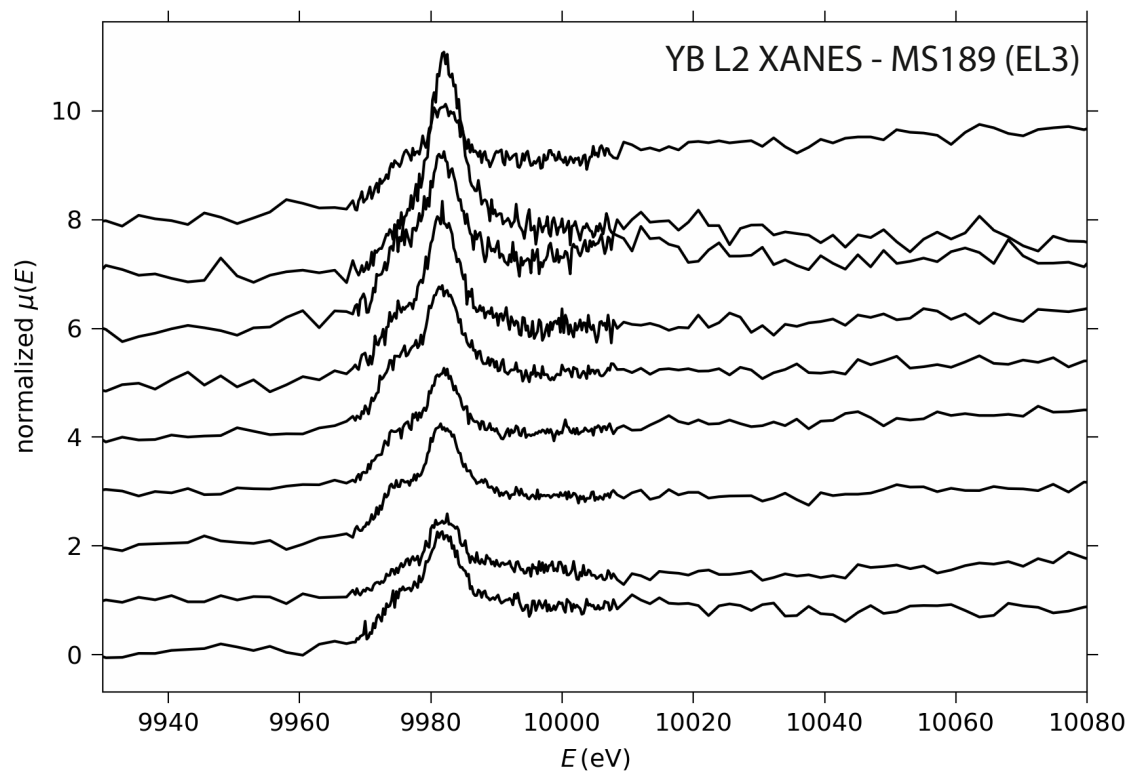


Fig S2_d

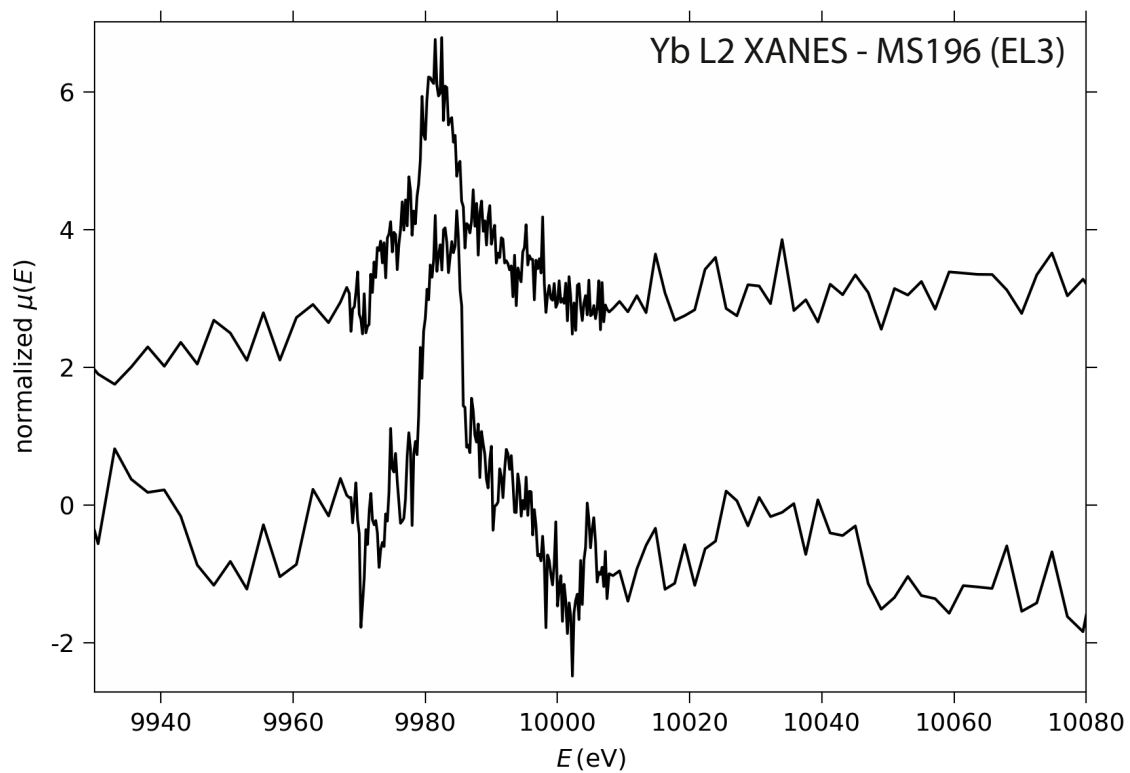


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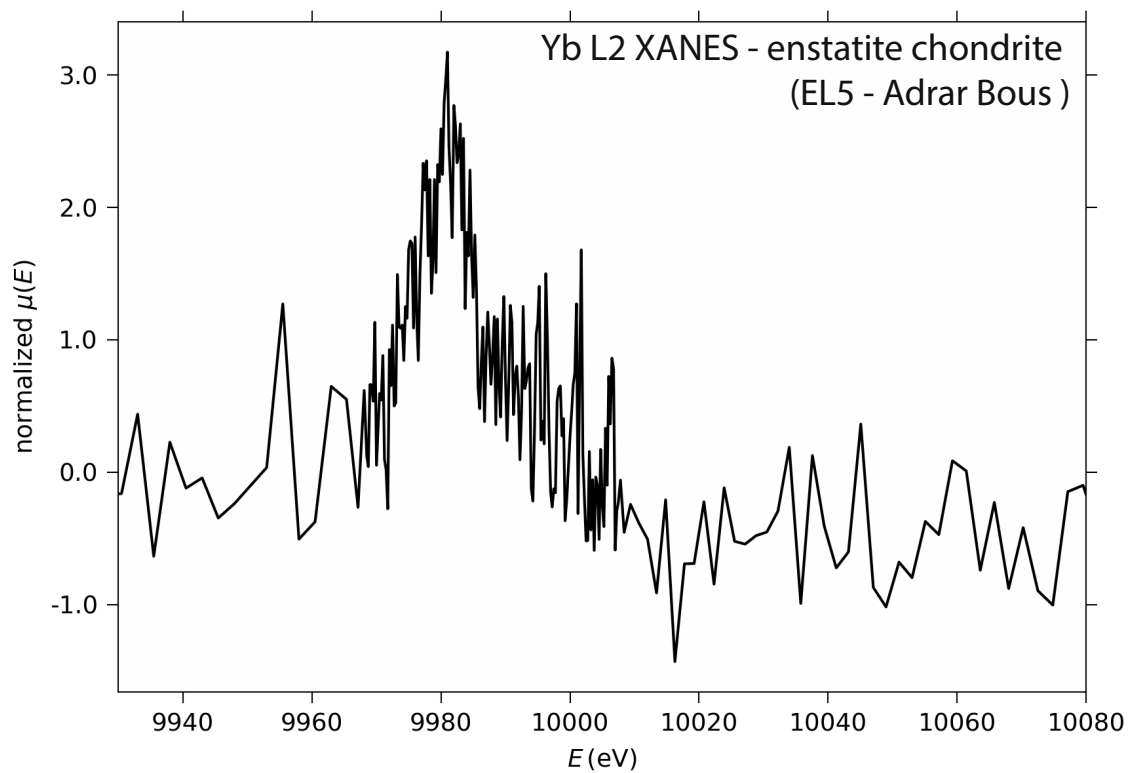


Fig S2_f

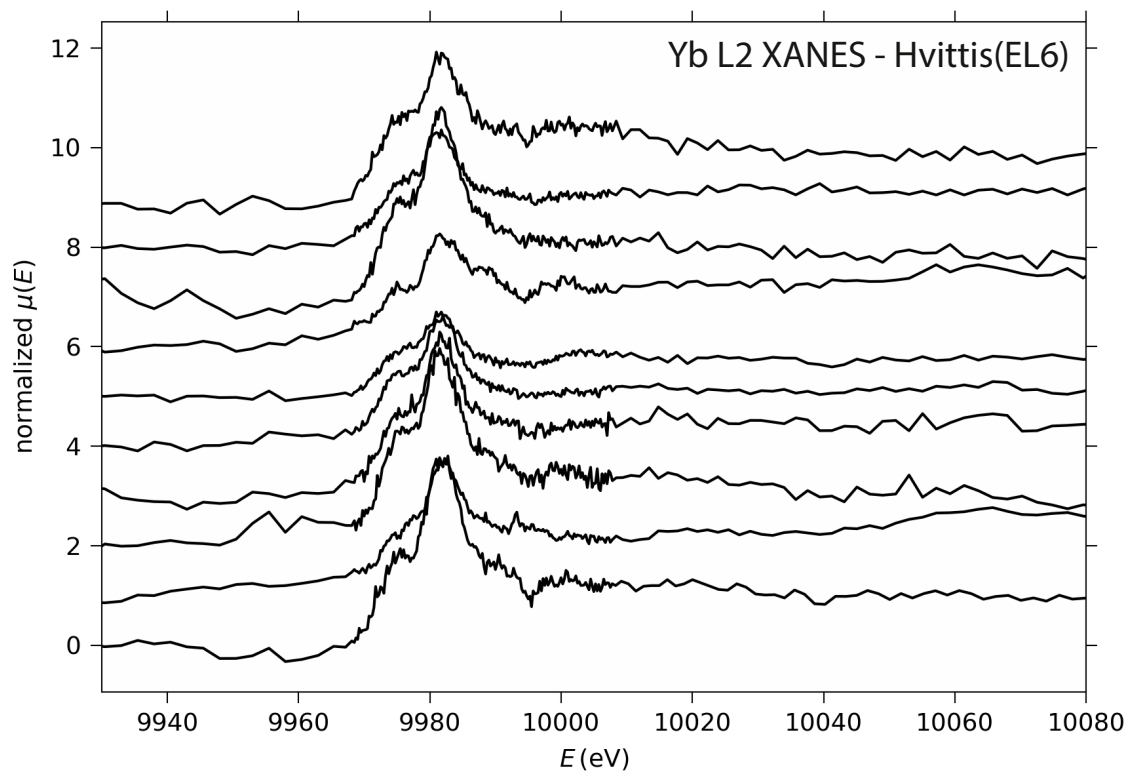


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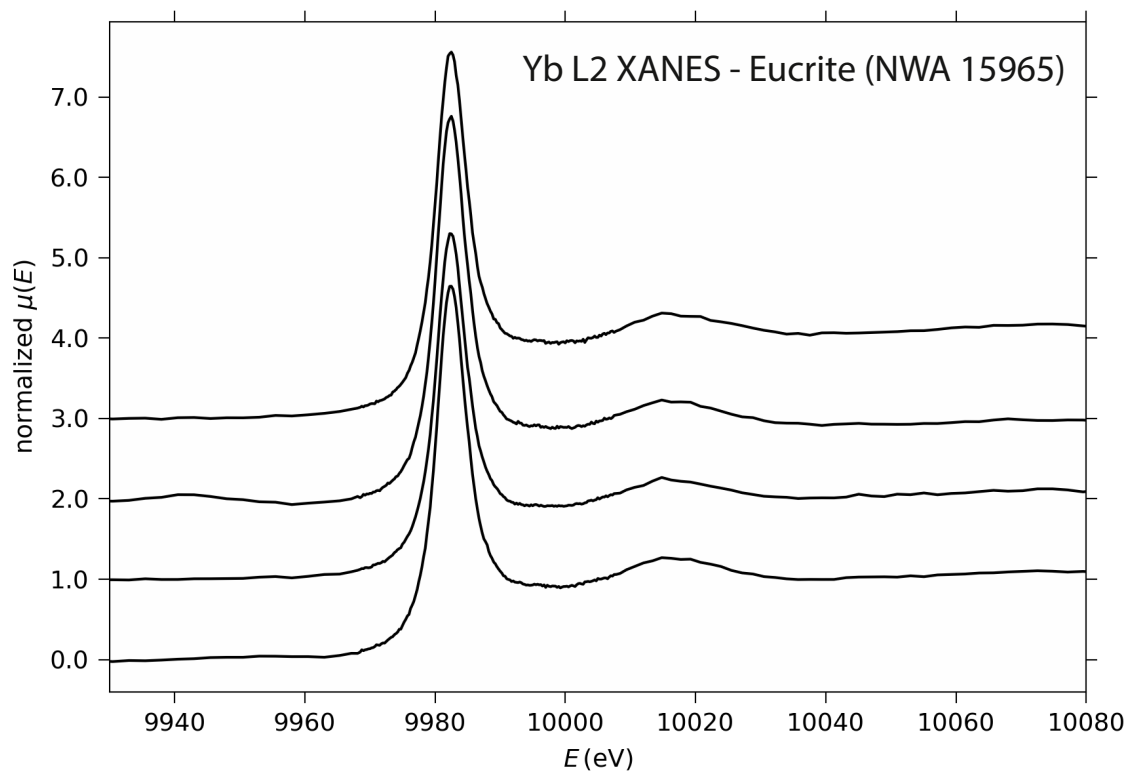
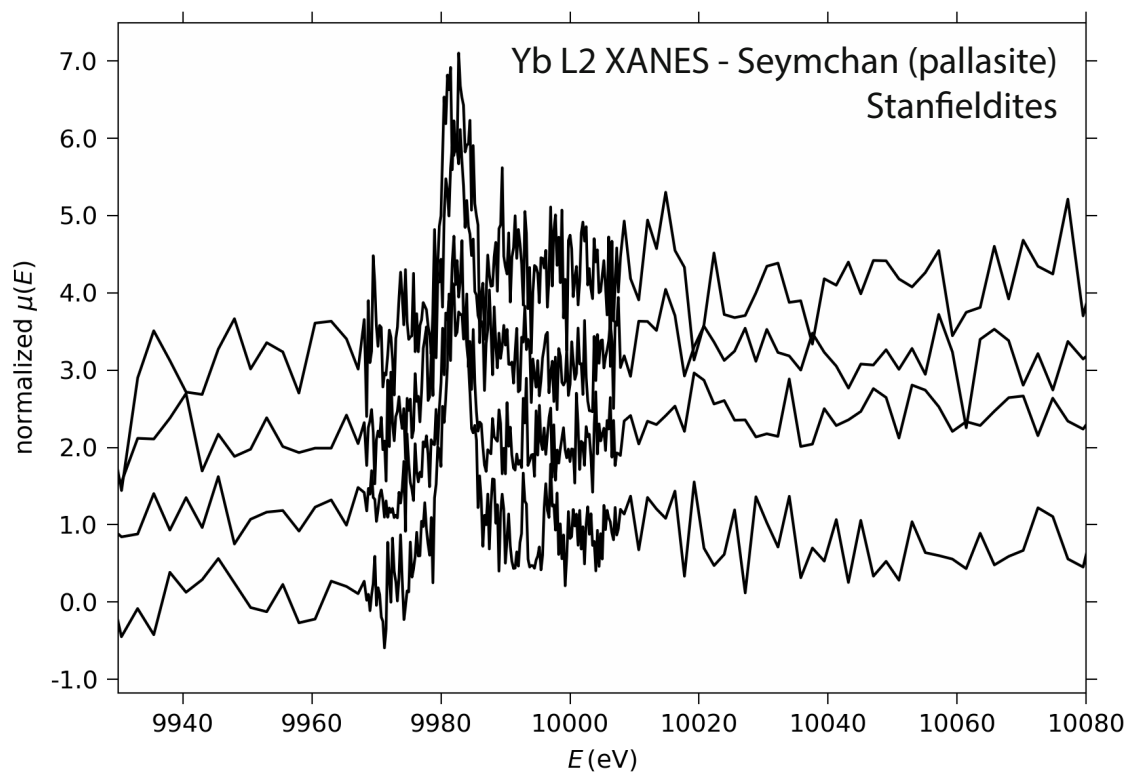
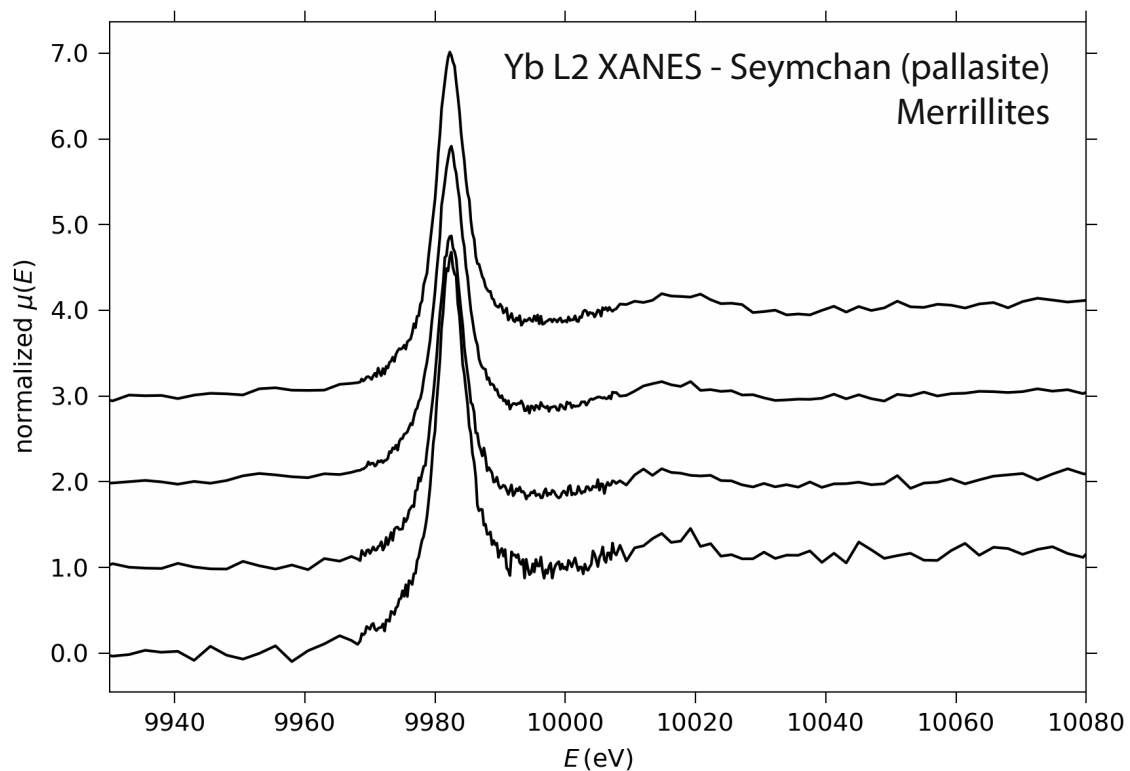


Fig S2_h

Fig S2_i



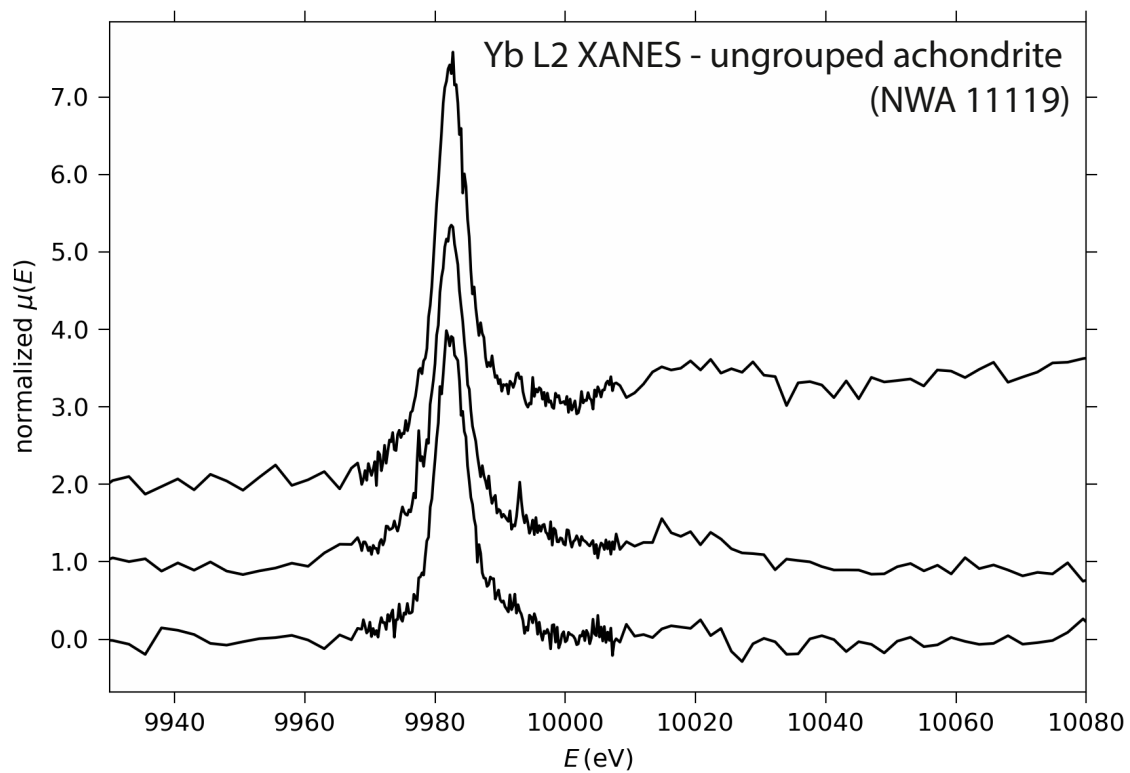


Fig S2_j

S3: Fits of the references materials (YbS and Yb₂S₃) to the oldhamite spectra recorded in enstatite chondrites

Fig S3_a: Enstatite chondrite Oudiyat Sbaa (EH5)

Fig S3_b: Enstatite chondrite MS189 (EL3)

Fig S3_c: Enstatite chondrite Adrar Bous (EL5)

Fig S3_d: Enstatite chondrite Hvittis (EL6)

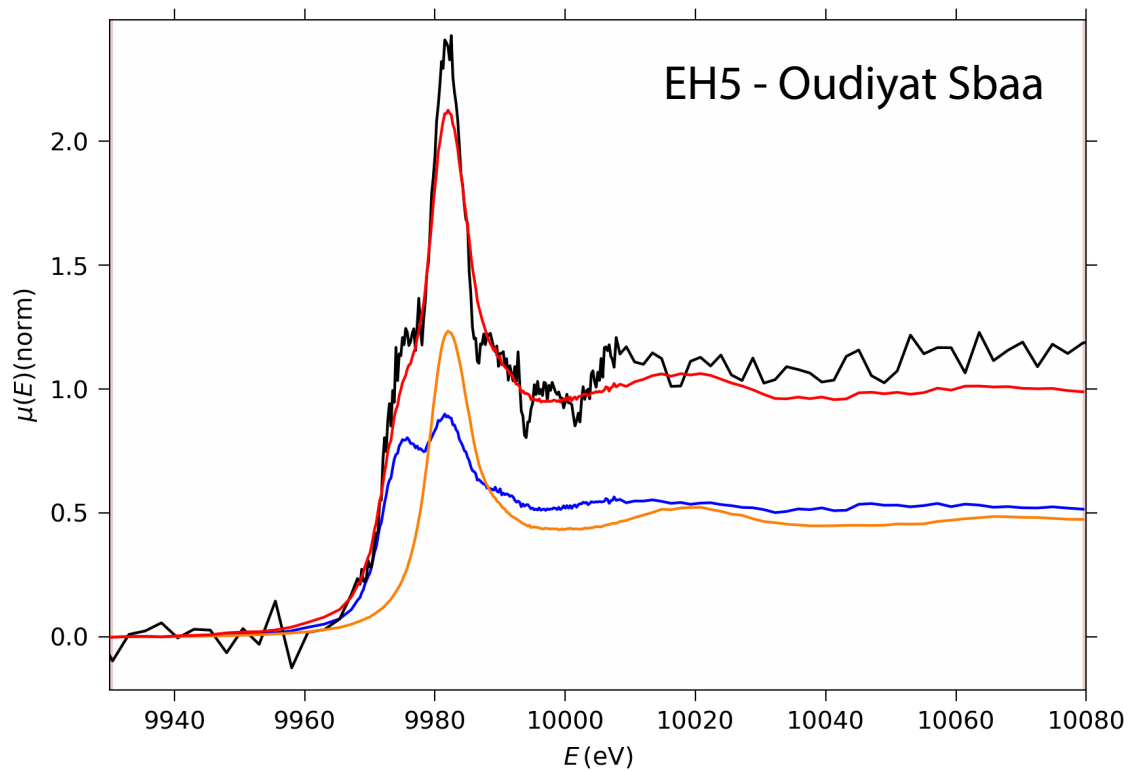


Fig S3_a

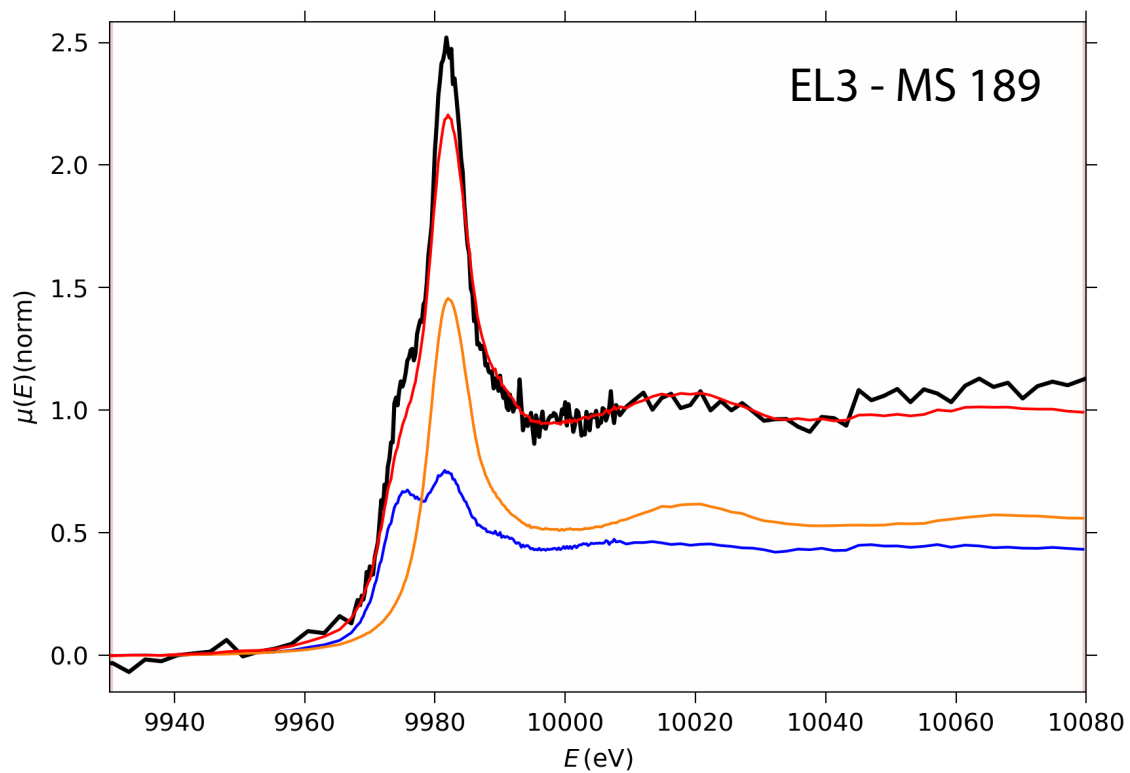


Fig S3_b

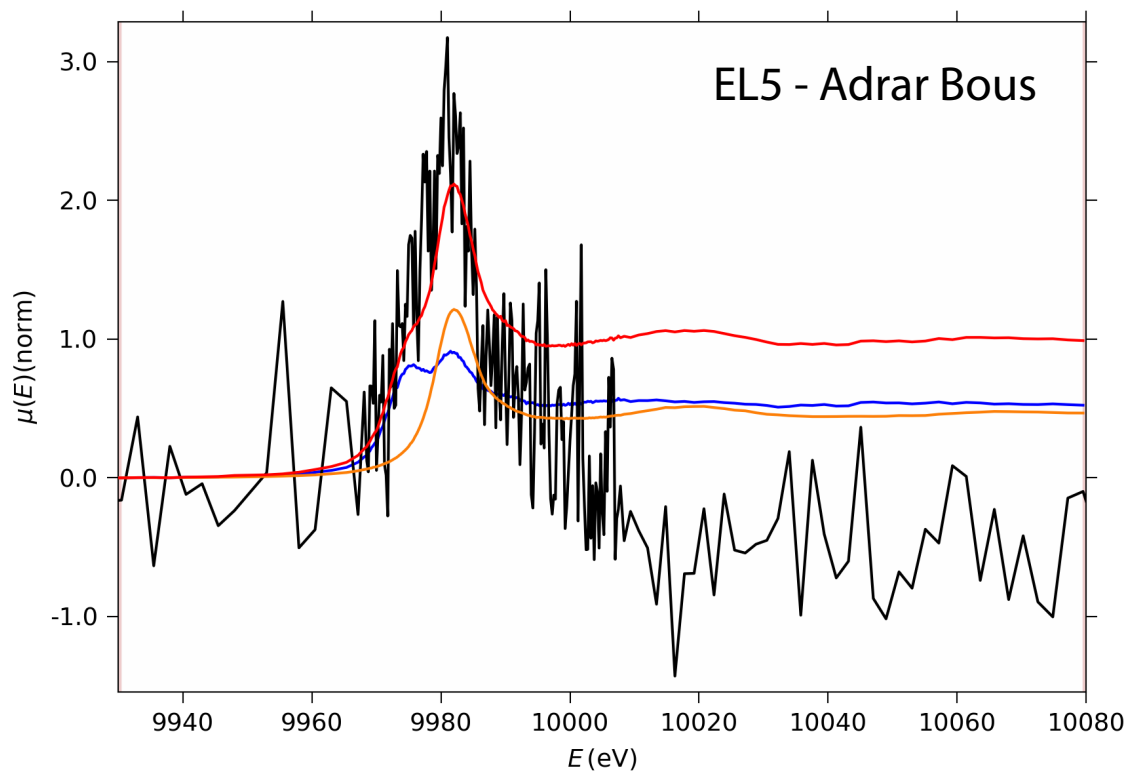


Fig S3_c

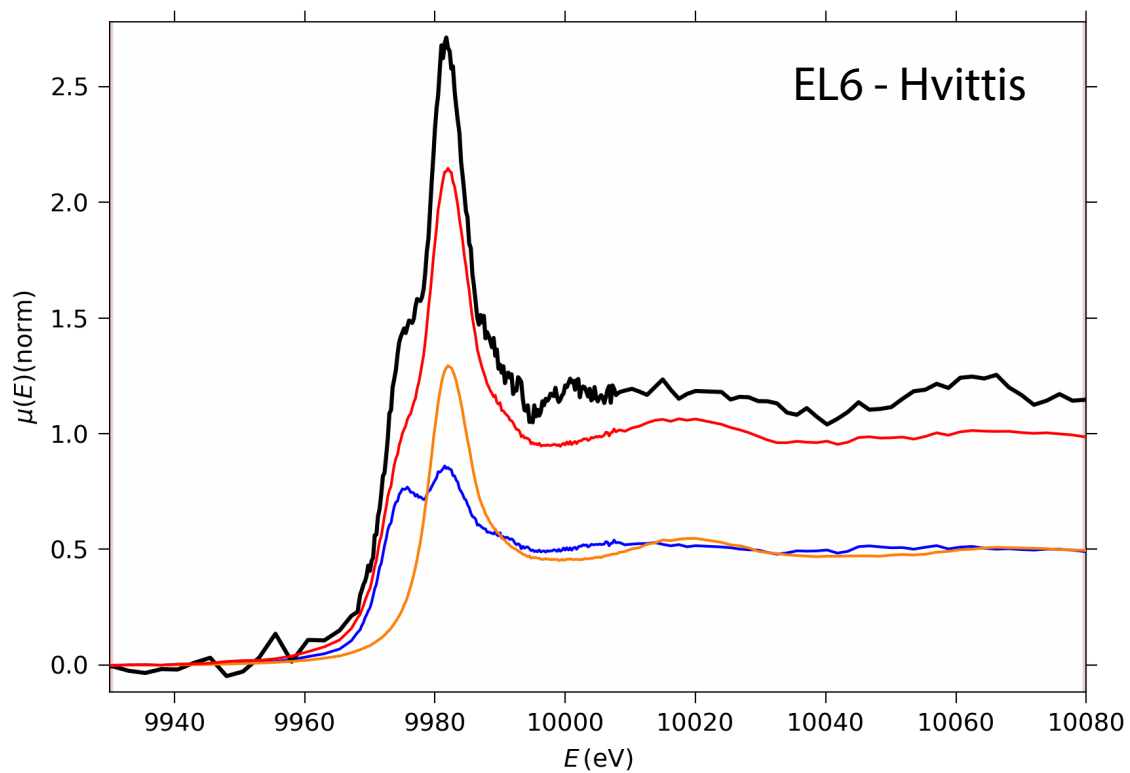


Fig S3_d