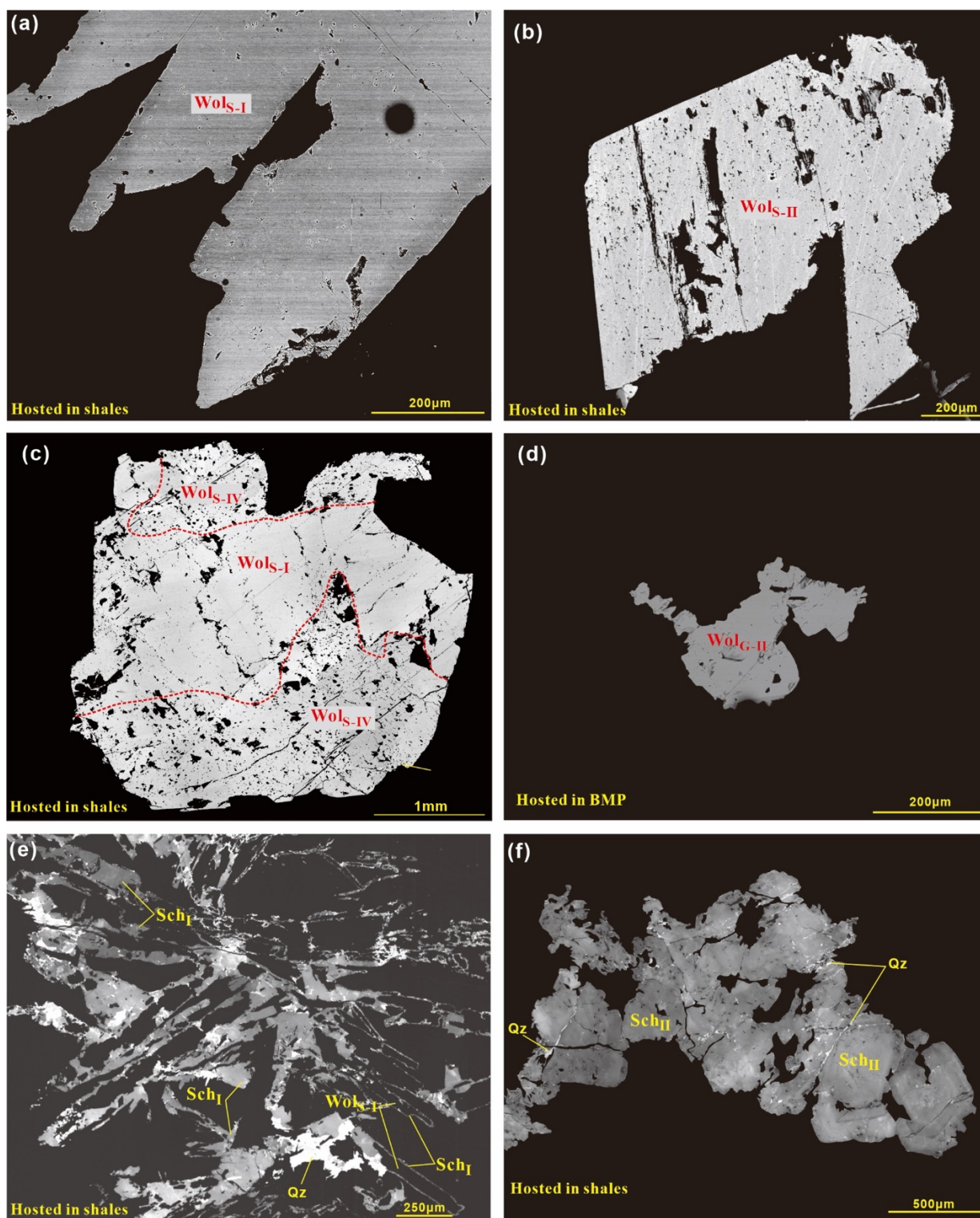


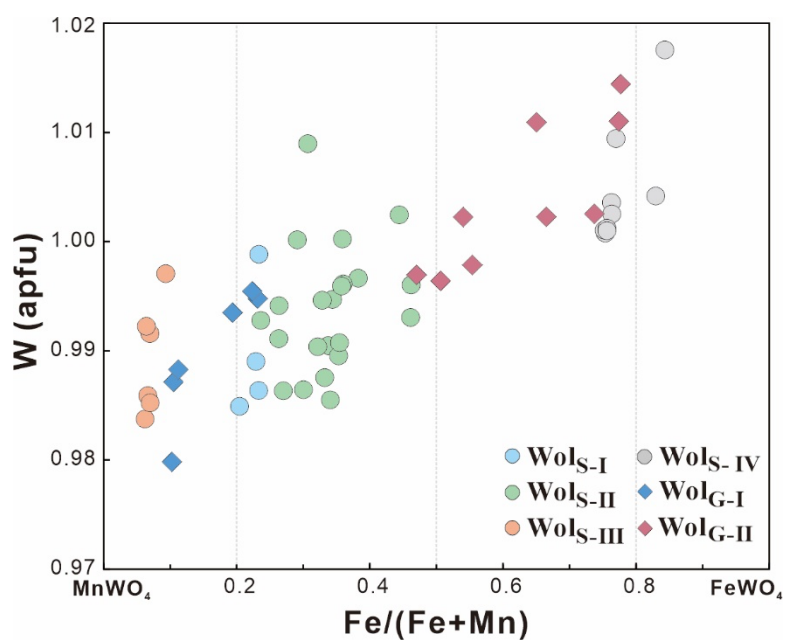
### Online Materials Figure OM1.

Simplified geologic cross sections of the Jiaoxi deposit (after Wang et al. 2018). See Fig. 2 for the locations of the cross sections A-A' and B-B'.



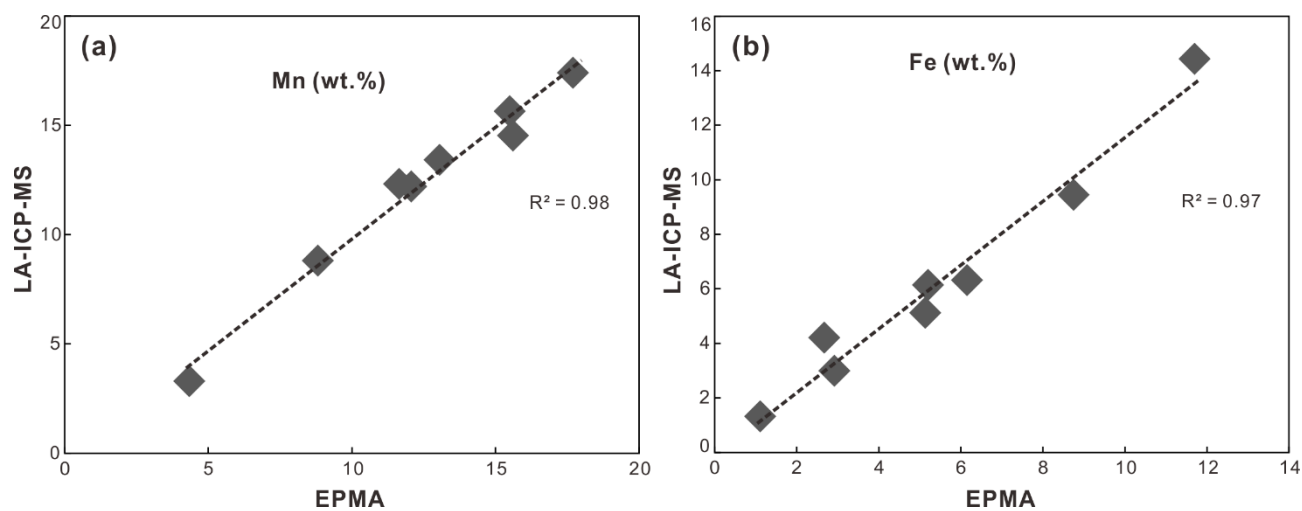
### Online Materials Figure OM2

High-contrast BSE and CL images of different wolframite and scheelite types. **(a-d)** BSE images showing homogeneous textures of different wolframites types. **(e)** SEM-CL images show anhedra Sch<sub>I</sub> crystals with homogeneous textures along the WolS-I. **(f)** SEM-CL image showing a subhedra Sch<sub>II</sub> crystal with growth zoning.



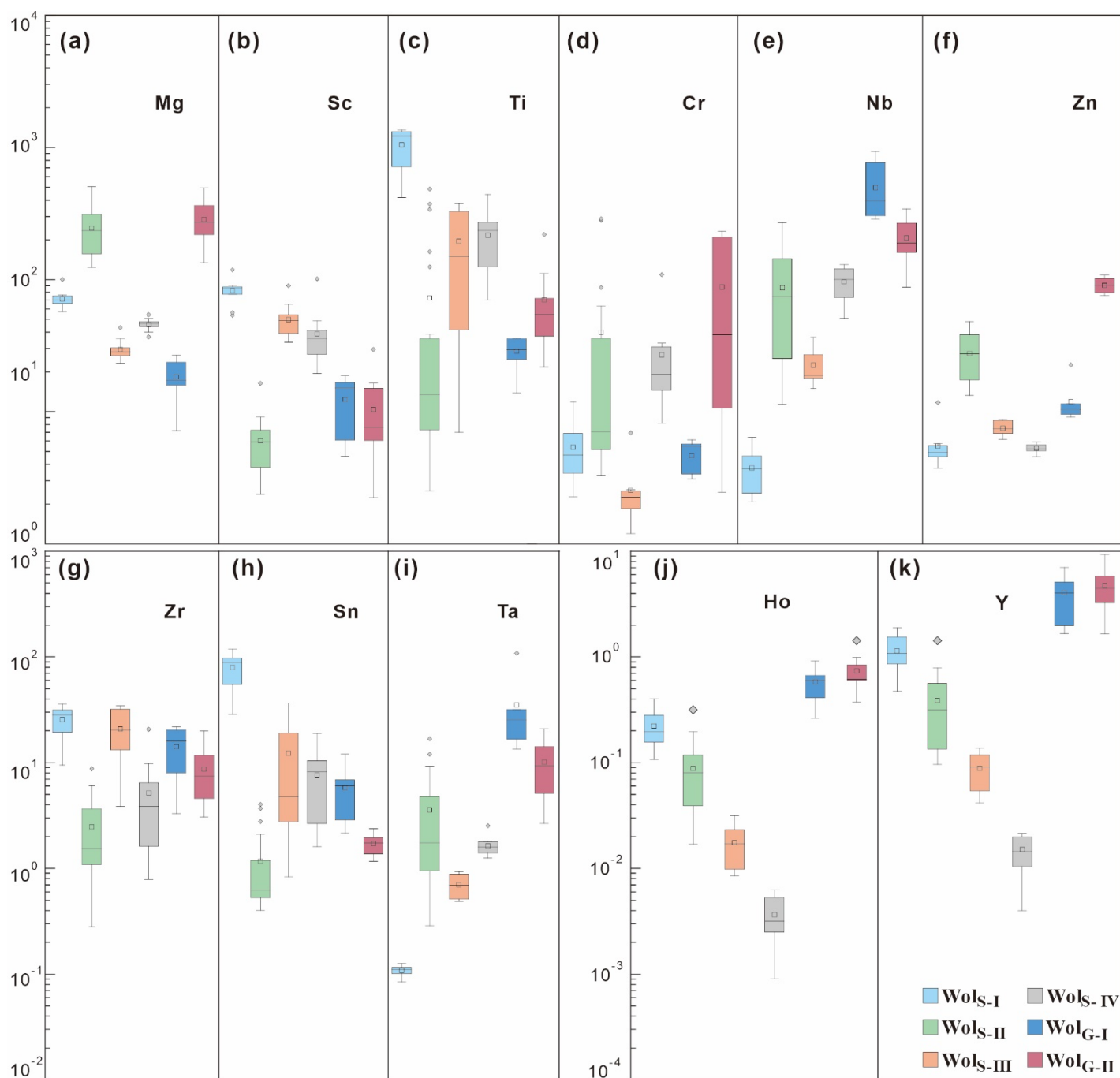
### Online Materials Figure OM3

Compositional variations of different wolframite types in the Jiaoxi deposit determined by EPMA represented in a W vs. Fe/(Fe+Mn) diagram.



#### Online Materials Figure OM4

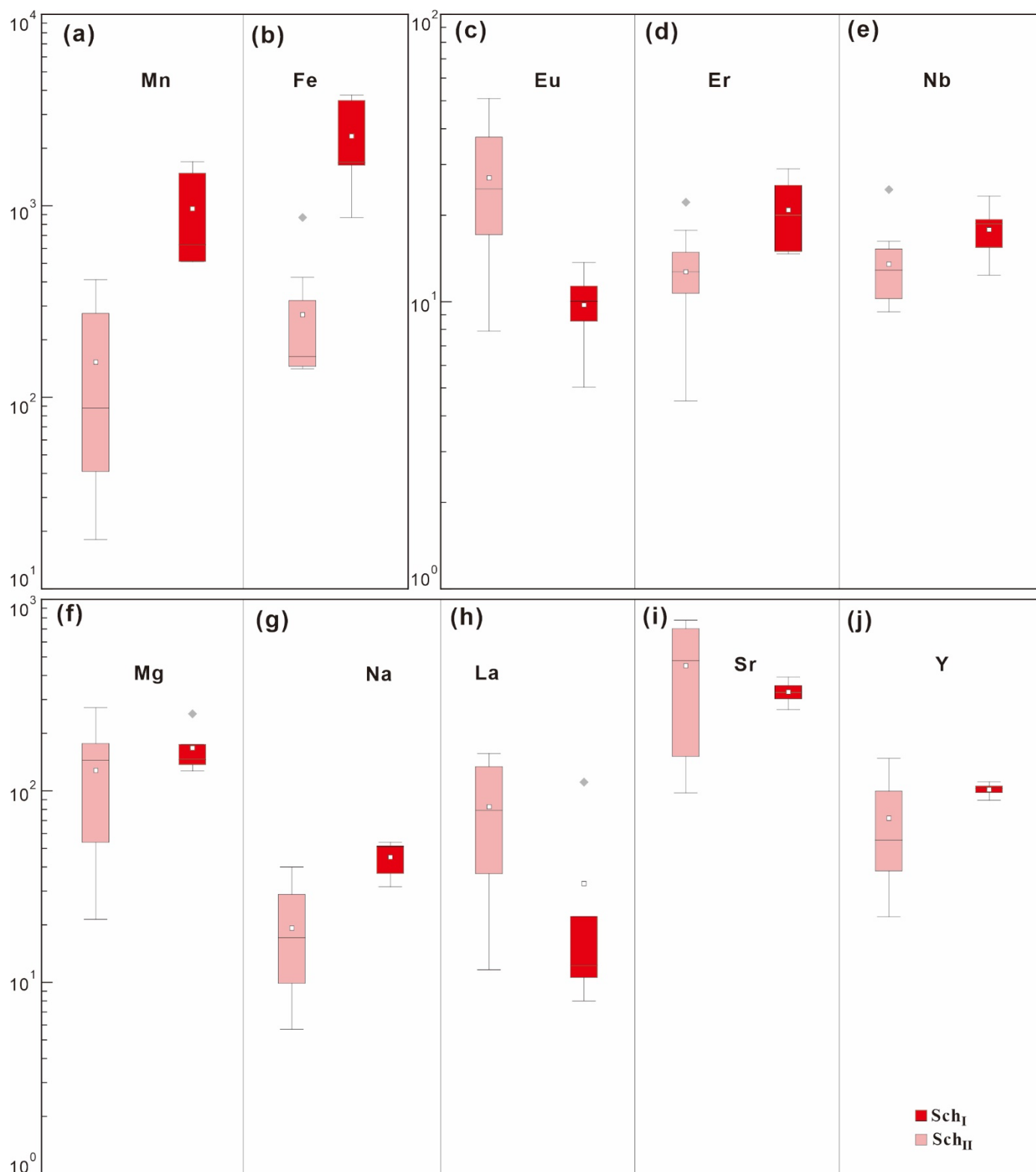
Compositions of Fe and Mn of wolframite in the Jiaoxi deposit determined by EPMA and LA-ICP-MS.



**Online Materials Figure OM5**

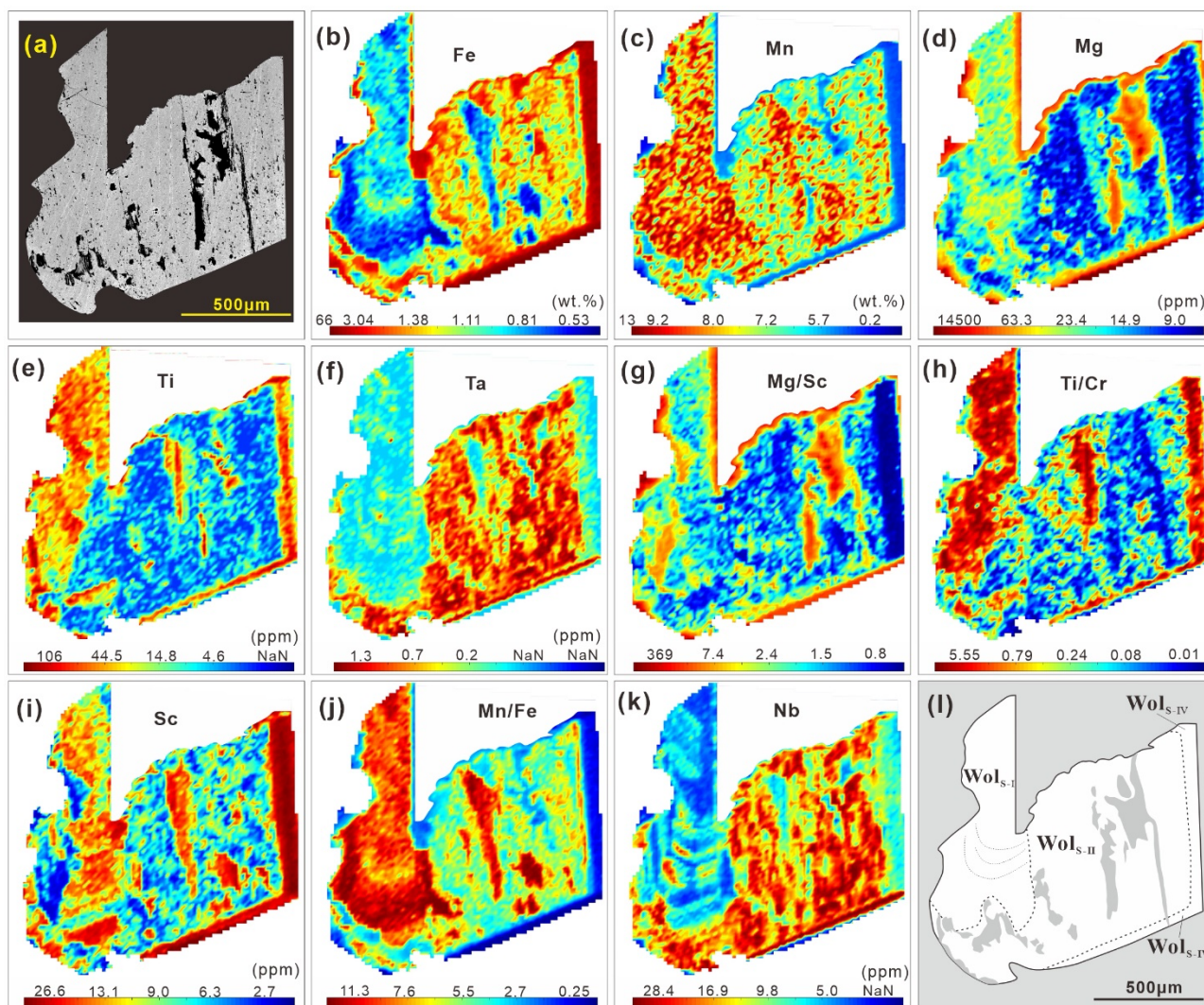
Box-whisker plots for the chemical compositions of different wolframite types. All elemental concentrations are in ppm. The top and bottom of the boxes represent the 25th and 75th percentile of the data and the horizontal lines at the end of the whisker represent the end of the 1.5 times the interquartile range. The black box represents the mean value.





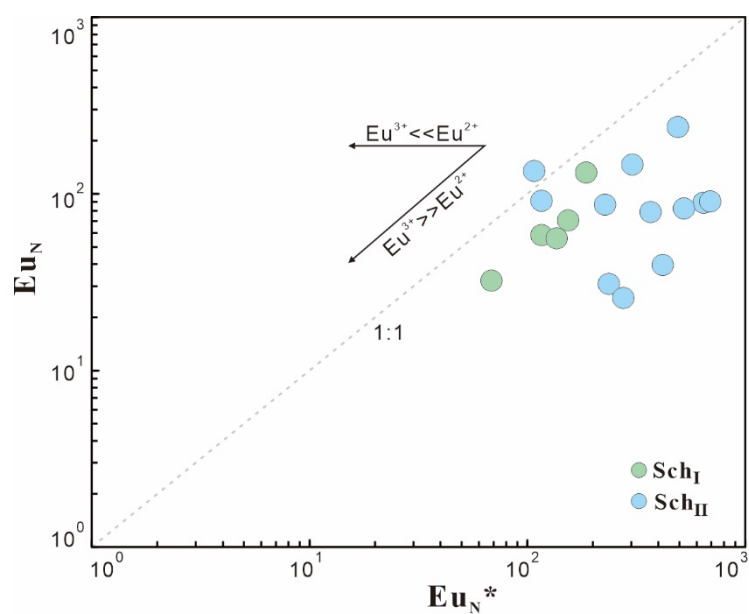
**Online Materials Figure OM6**

Box-whisker plots for concentrations (in ppm) of two scheelite types.



### Online Materials Figure OM7

Backscattered electron image and LA-ICP-MS trace element mapping for wolframite crystal ZK2001-331.34. **(a)** Backscattered electron image showing a relatively homogeneous texture. **(b-k)** Trace element mapping demonstrating wolframite Fe, Mn, Mg, Ti, Ta, Sc, Mg/Sc, Ti/Cr, Mn/Fe, and Nb zonation. **(l)** Schematic diagram for the chemical zones in crystal ZK2001-331.34.



### Online Materials Figure OM8

Chondrite-normalized Eu concentrations ( $Eu_N$ ) vs. calculated  $Eu_{CN}^*$  values for scheelites.  $Eu_N^* = (Sm_N \times Gd_N)^{1/2}$ .

The dashed line represents  $Eu_N/Eu_N^* = 1$