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Supplementary Table S1. Major element mass fractions (wt.%) of the PZH12-09 ilmenite determined using routine EPMA method.

Supplementary Table S2. Major (wt.%) and trace element (μ g/g) mass fractions of the PZH12-09 ilmenite determined using LA–ICP–MS.

Supplementary Table S3. Major element (wt.%) and trace element ($\mu g/g$) mass fractions of the PZH12-09 ilmenite determined using SM ICP–MS.

Supplementary Table S4. Major and trace element composition (μg/g) of the PZH12-09 ilmenite using high-precision EPMA method.

Supplementary Fig. S1 Frequency distributions of trace elements determined by LA–ICP–MS, indicating normal distributions and demonstrating the homogeneity of the studied PZH12-09 ilmenite.