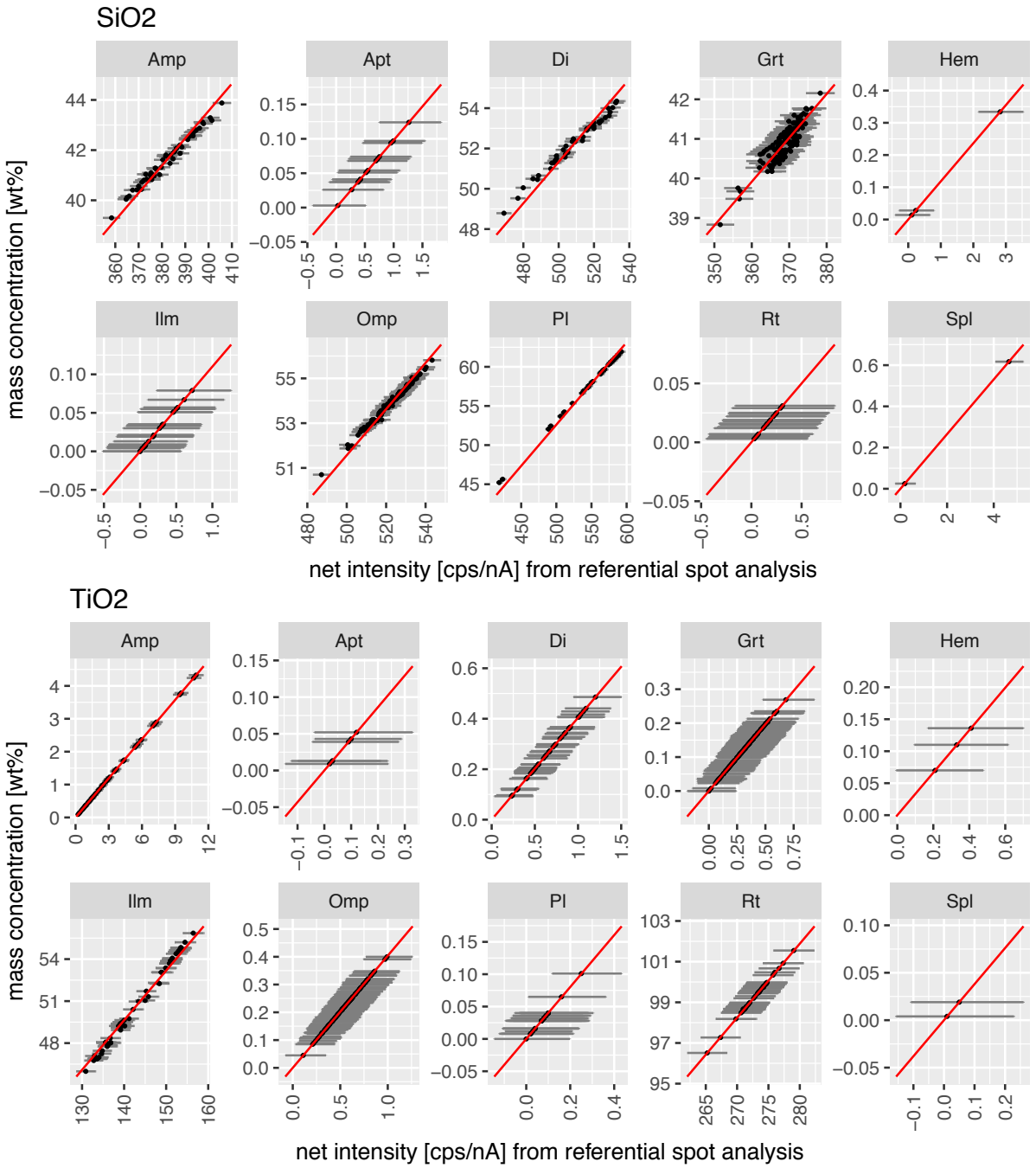

Figure S1. Mass concentrations vs. net X-ray intensities for all analyzed elements in all recognized mineral species. The lopes of the red lines are estimated by least square regressions are equivalent to α_i^{phase}.

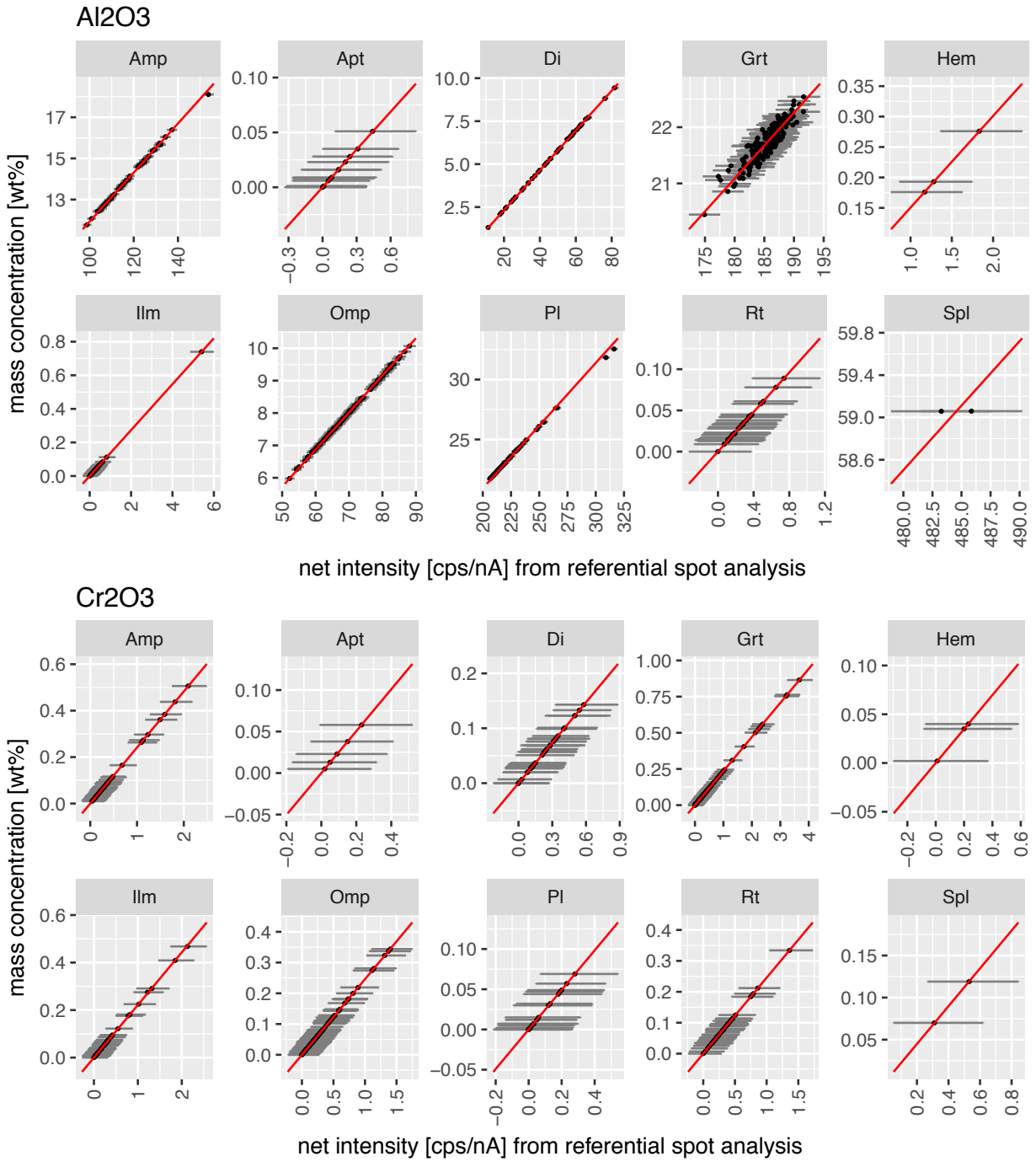

FIGURE S1. —*CONTINUED*

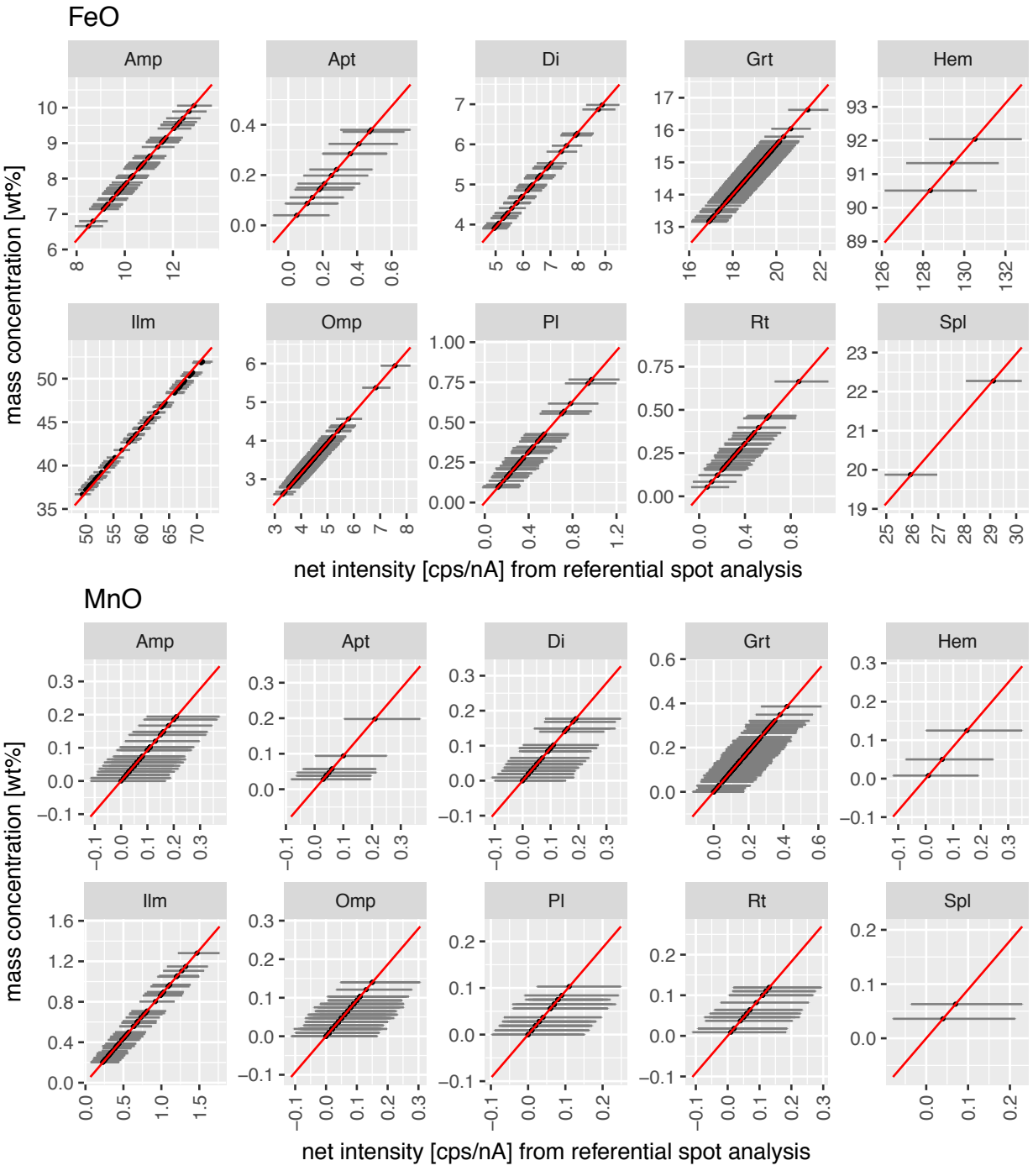

FIGURE S1. —*CONTINUED*

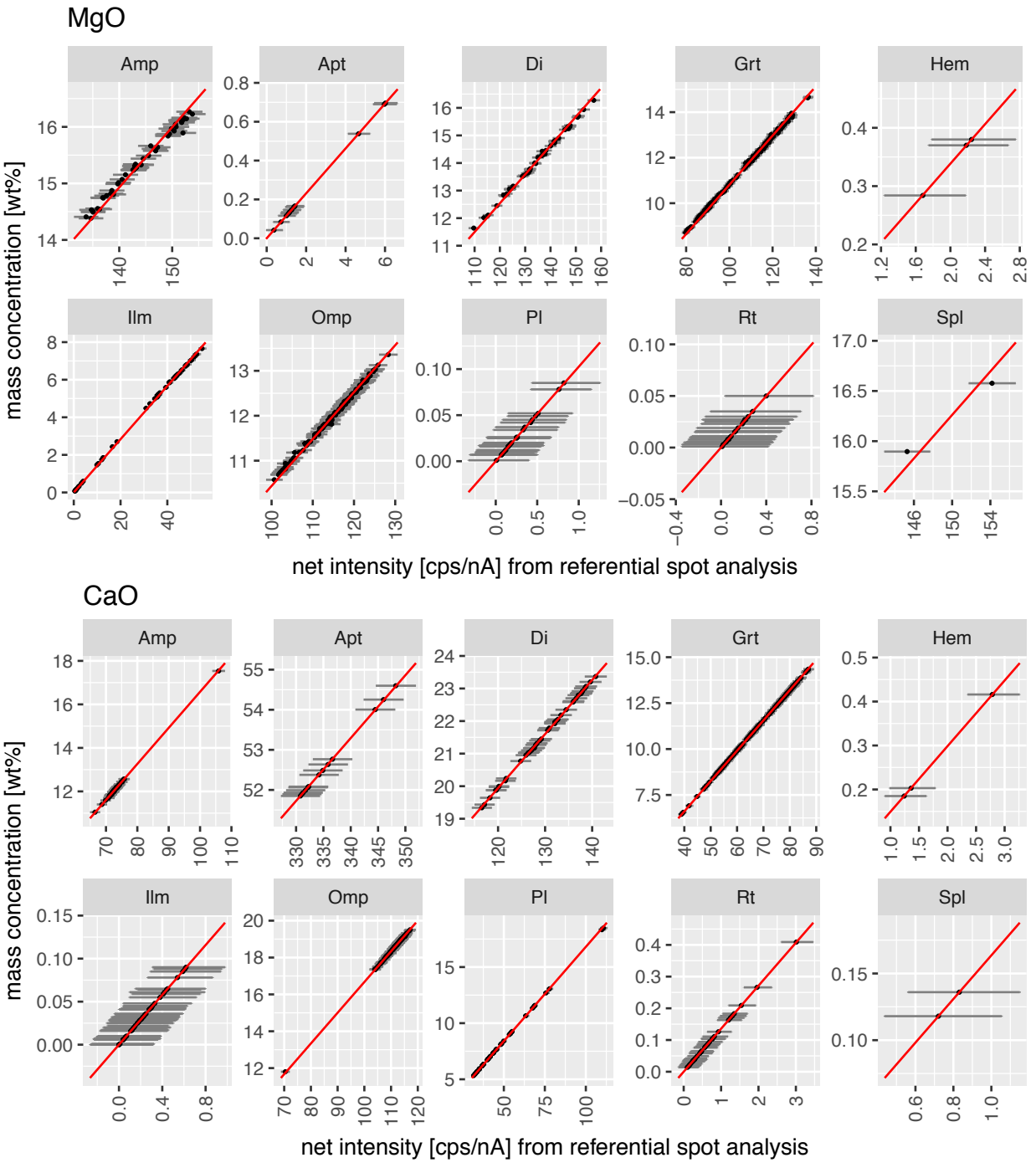

FIGURE S1. —*CONTINUED*

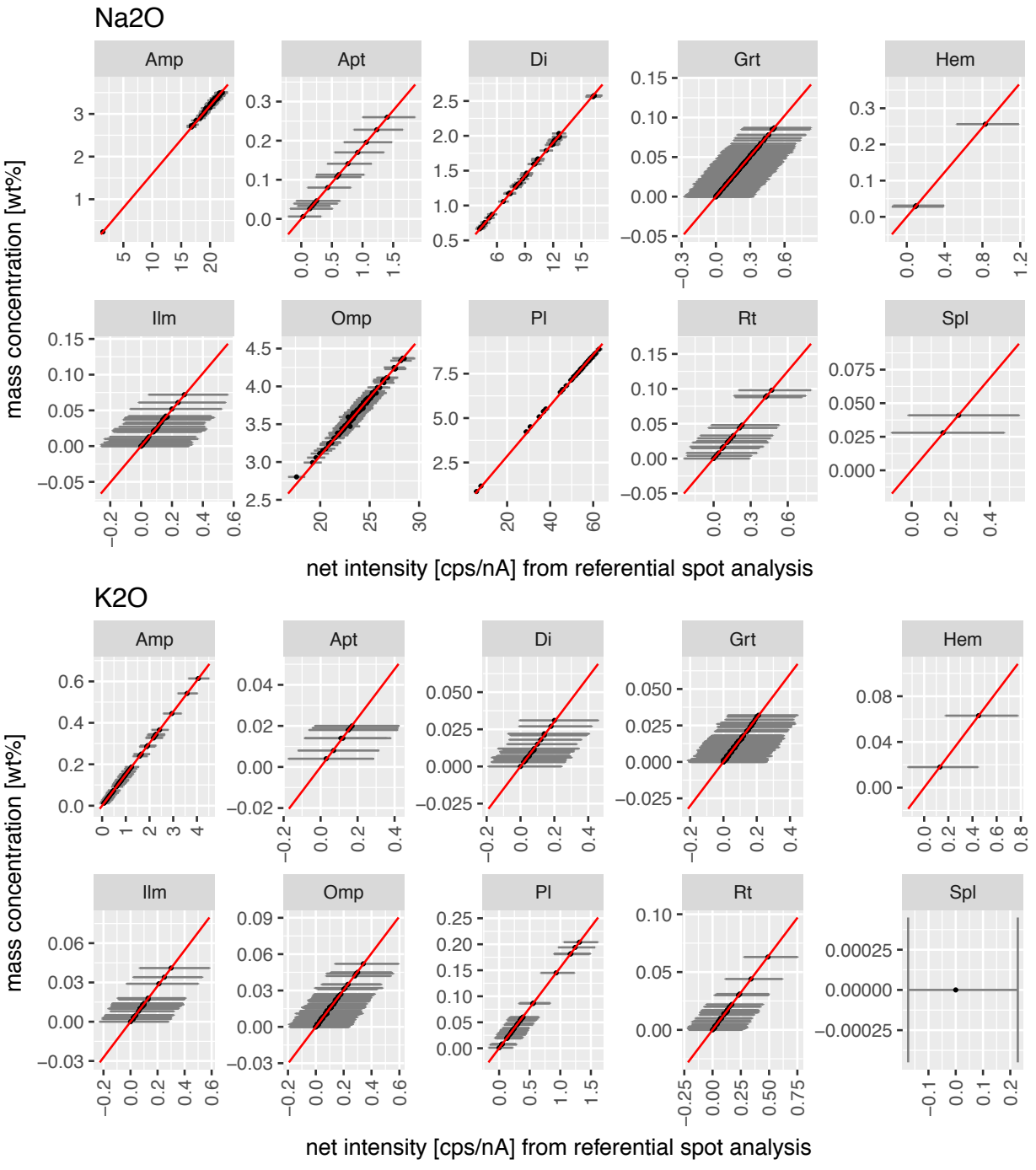

Figure S1. —*Continued*

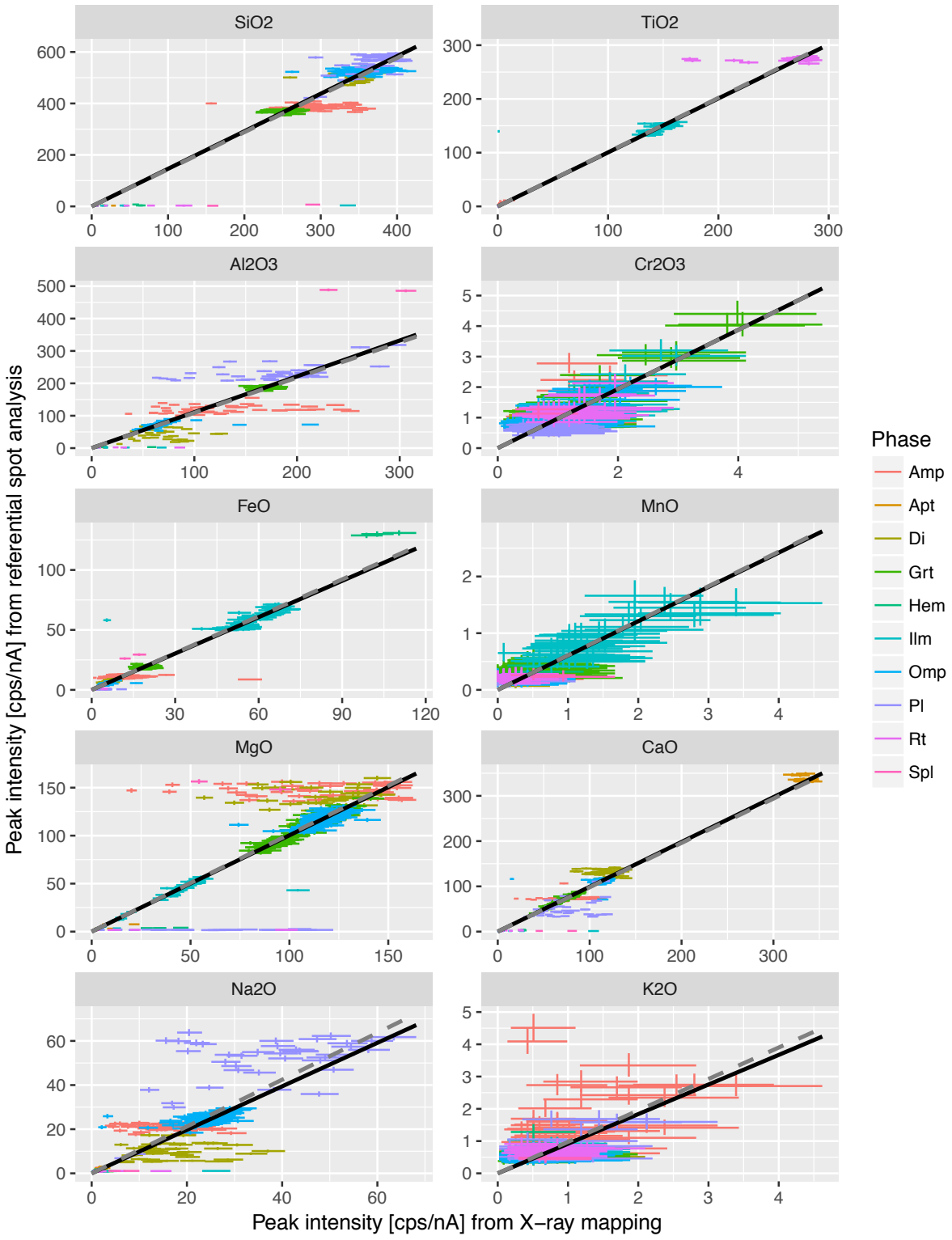

FIGURE S2. Comparison of peak X-ray intensities from referential spot analysis to X-ray mapping for all analyzed elements. The black lines and gray dashed lines show regressions. The black lines were obtained from weighted least squares regression assuming that data points from fine-grained phases (amphibole, diopside, hematite, plagioclase and spinel) are weighted to 0, and the others by X^{phase}. The gray dashed lines were calculated using ordinary least squares without weighting. Note that "Phase" in the legend indicates the phase identified by referential spot analysis and does not necessarily correspond to the phase targeted by X-ray mapping, owing to possible multi-phase pixels.

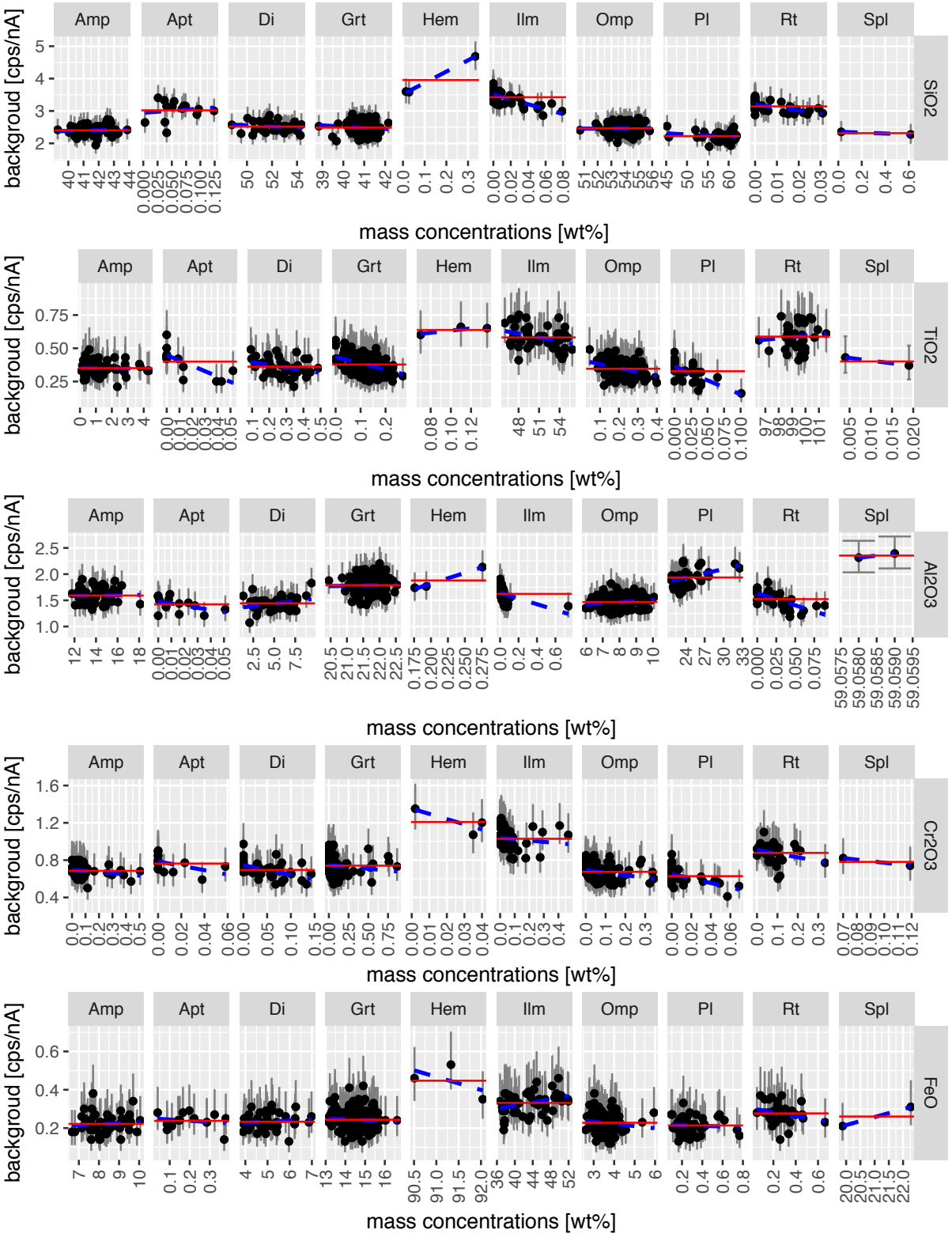

FIGURE S3. Relationship between actual mass concentrations determined by spot analysis and corresponding background X-ray intensities for all analyzed elements in all recognized mineral species. The red lines indicate average values and blue dashed lines are obtained from least squares regressions.

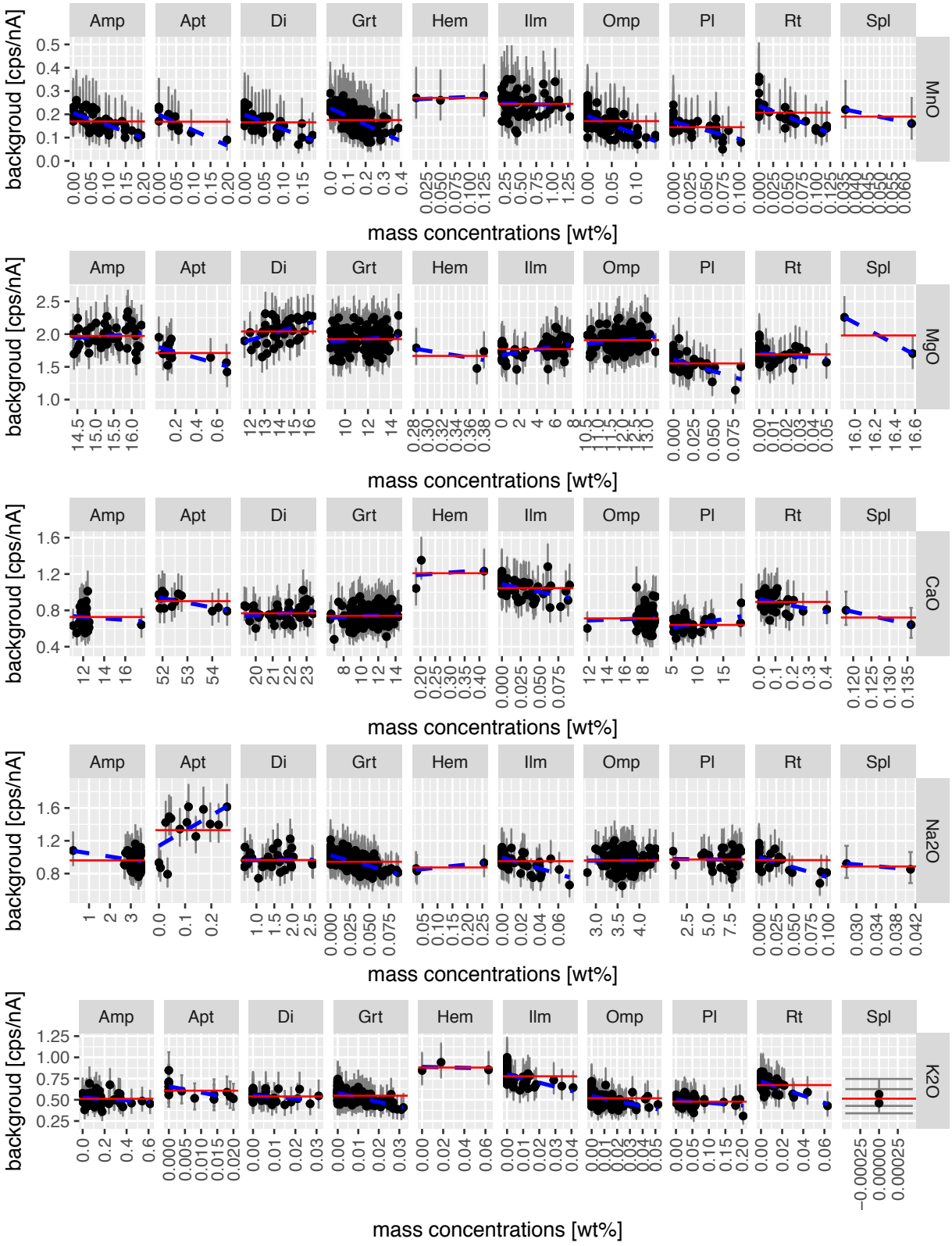

FIGURE S3.—*CONTINUED*

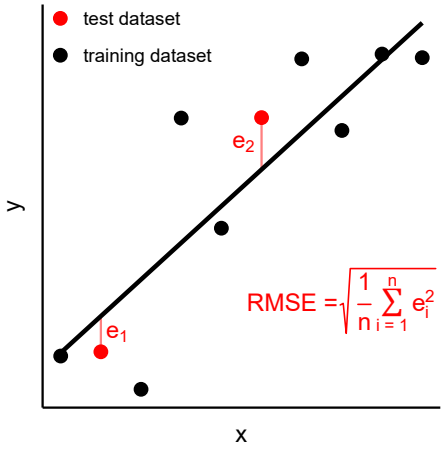

Figure S4. Schematic of CV. A sample dataset is divided into a training dataset (black points) and a test dataset (red points). A calibration curve (black line) is calculated using the training dataset. Validity of the calibration curve is evaluated by RMSE. A small RMSE indicates the calibration curve reasonably explains the relationship between variables.