Site-selective characterisation of electron trapping centres in relation to chemistry, structural state and mineral phases present in single crystal alkali feldspars

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Supplementary Material

Site-selective characterisation of electron trapping centres in relation to chemistry, structural state and mineral phases present in single-crystal alkali feldspars

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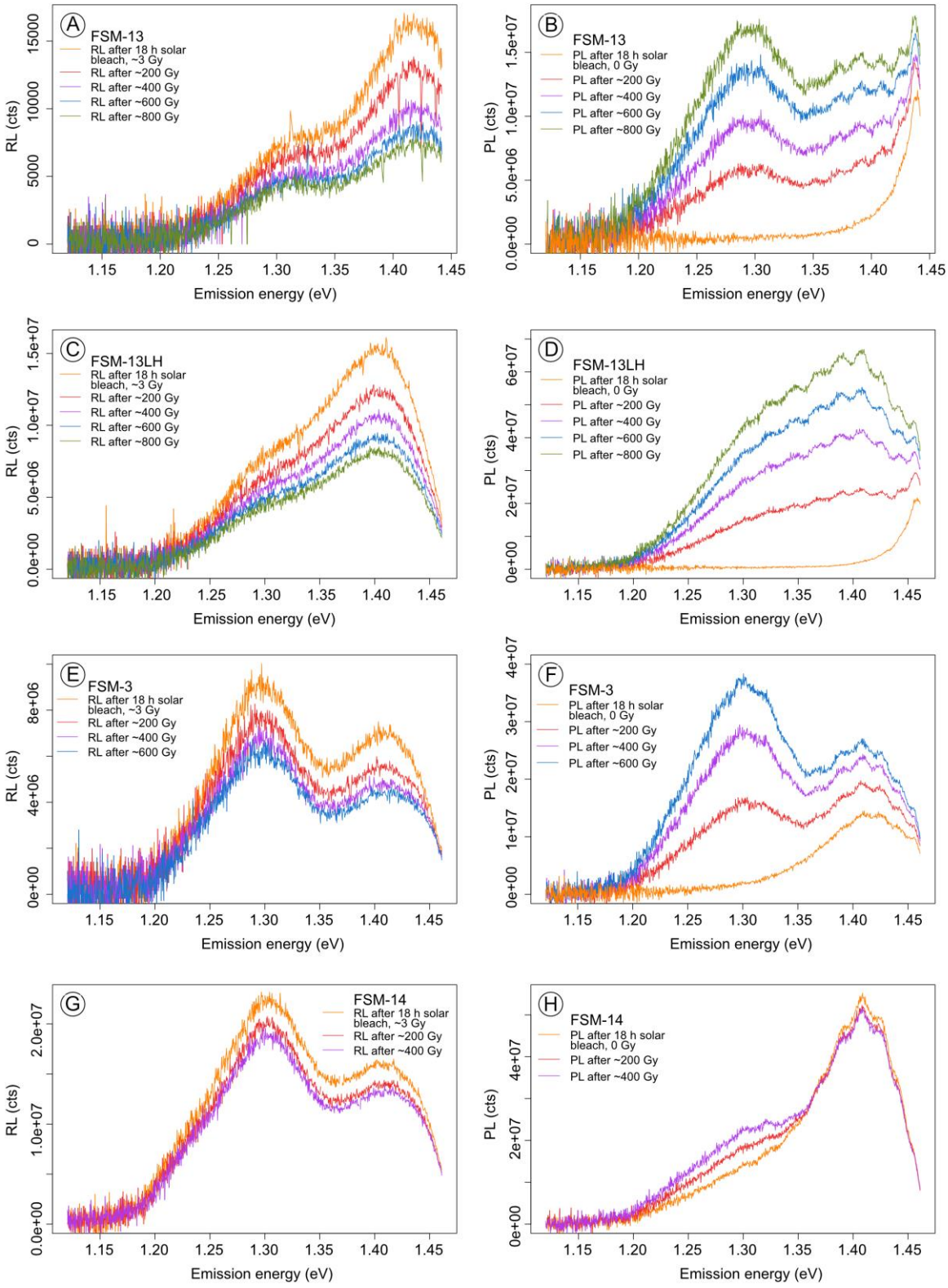

Fig. S1. RL (A, C, E, G) and PL (B, D, F, H) emission spectra, measured after different duration of X-ray irradiation for samples FSM-13, FSM-13LH, FSM-3 and FSM-14. The orange curve in the PL spectra is the residual signal measurement after 18 hours of solar simulator bleaching and prior to any dose administered.

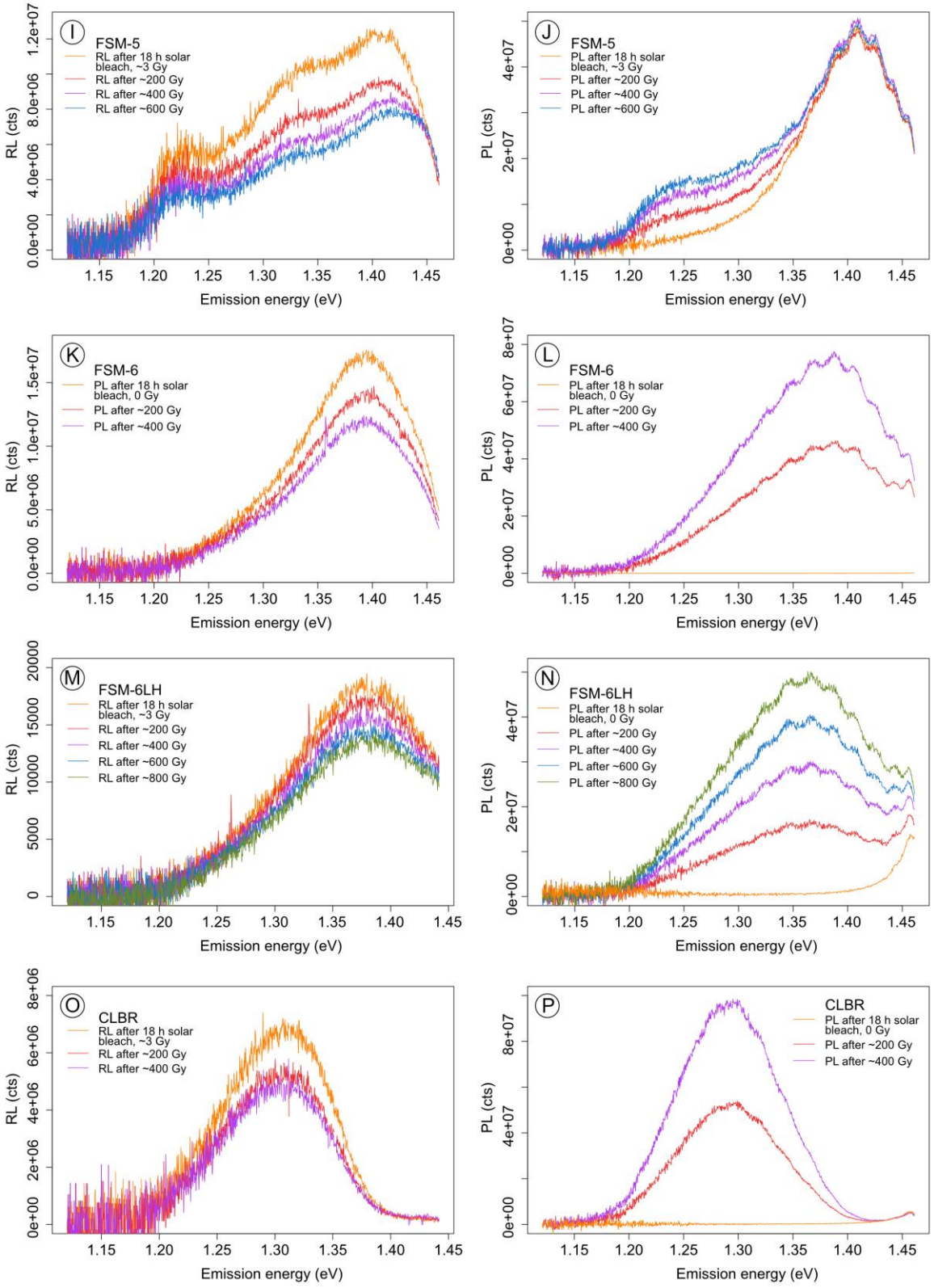

Fig. S1 (continued). RL (I, K, M, O) and PL (J, L, N, P emission spectra, measured after different duration of X-ray irradiation for samples FSM-5, FSM-6, FSM-6LH and CLBR. The orange curve in the PL spectra is the residuals signal measurement after 18 hours of solar simulator bleaching and prior to any dose administered.

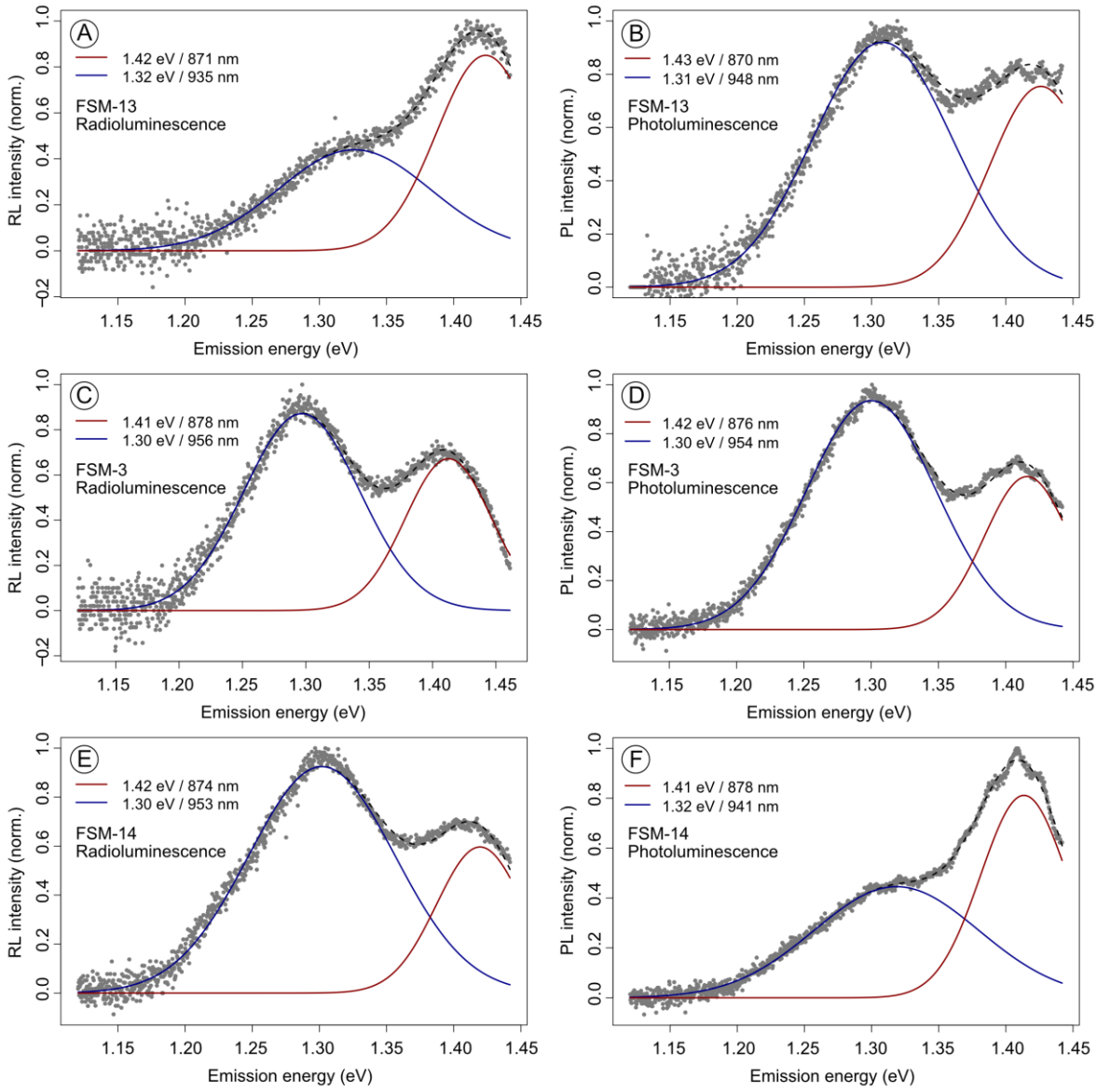

Fig. S2. Radioluminescence (A, C, E) and photoluminescence (B, D, F) emission spectra of samples FSM-13 (A, B), FSM-3 (C, D) and FSM-14 (E, F). The recorded spectra were fitted using two Gaussian peaks. The mean of the distribution is given in the individual figures for both distributions. Further details of the fit are also presented in Table 2.

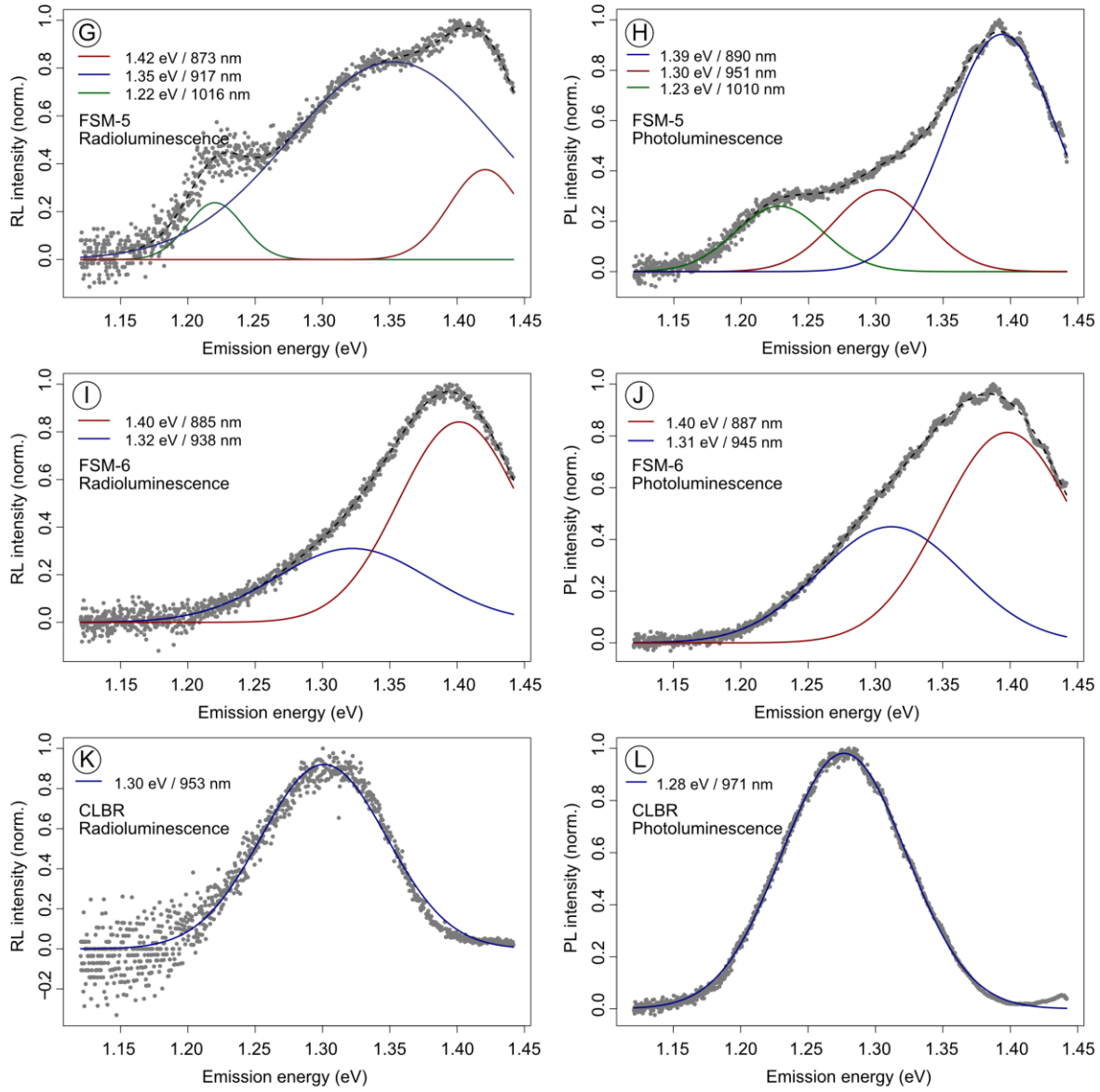

Fig. S2 (continued). Radioluminescence (G, I, K) and photoluminescence (H, J, L) emission spectra (continued) of samples FSM-5 (G, H), FSM-6 (I, J) and CLBR (K, L). The recorded spectra were fitted using up to three Gaussian peaks. The RL and PL emission spectra of the albite sample CLBR were only fitted using a single Gaussian distribution. The mean of the distribution is given in the individual figures. Further details of the fit are also presented in Table 2.

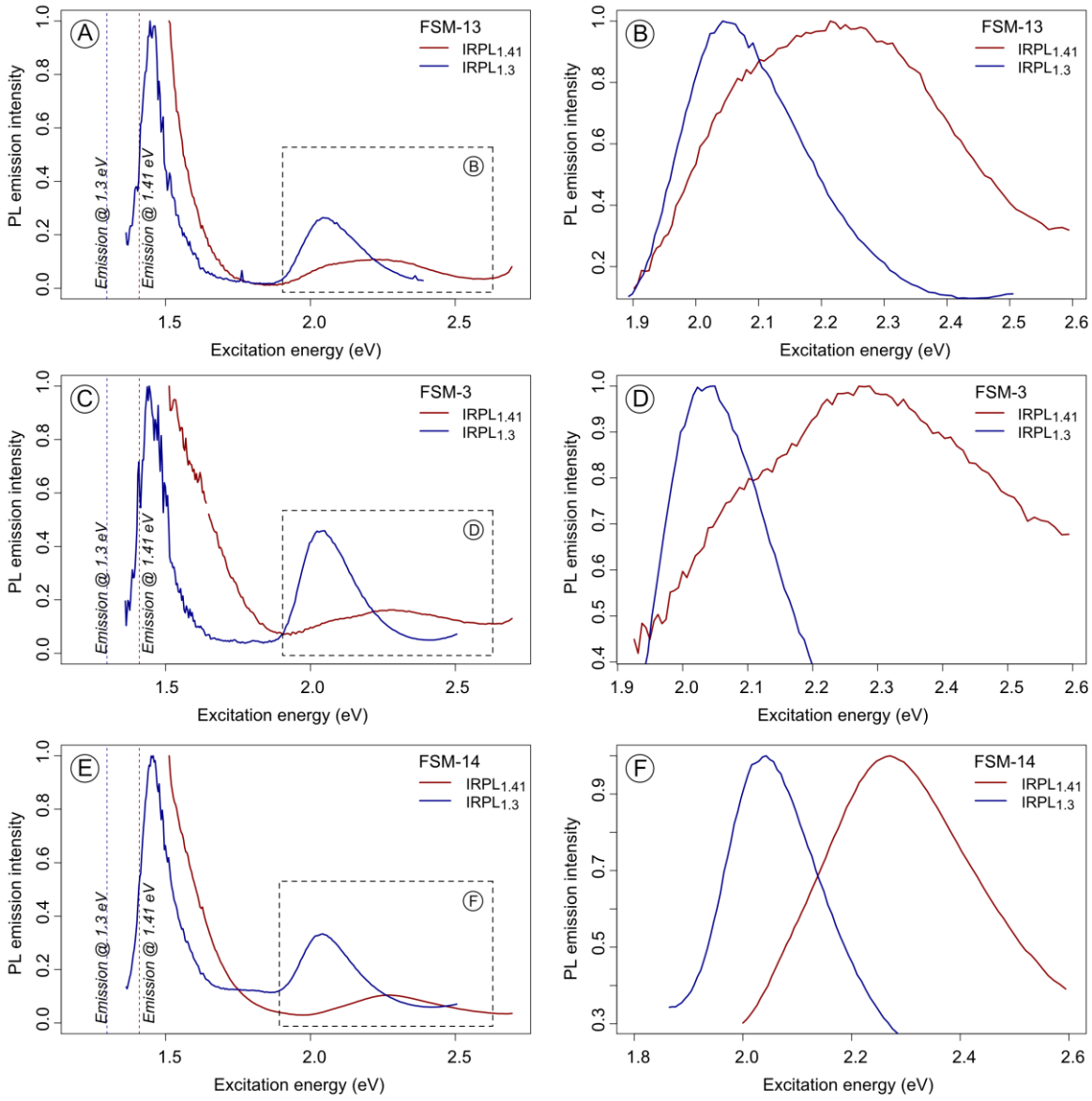

Fig. S3. Excitation spectra for the $IRPL_{1.41}$ and $IRPl_{1.3}$ nm emissions of samples FSM-13 (A, B), FSM-3 (C, D) and FSM-14 (E, F). The graphs were normalised to the point of highest signal intensity. For figures B, D and F, excitation peak 2 was isolated and normalised separately. These graphs were used to obtain the trap depth of the principal dosimetric trap in feldspars, by picking the point of highest intensity for the individual curves. The thus obtained mode (in eV and µm) are given in Table 3. The emission window is indicated in A, C and E with dashed vertical lines.

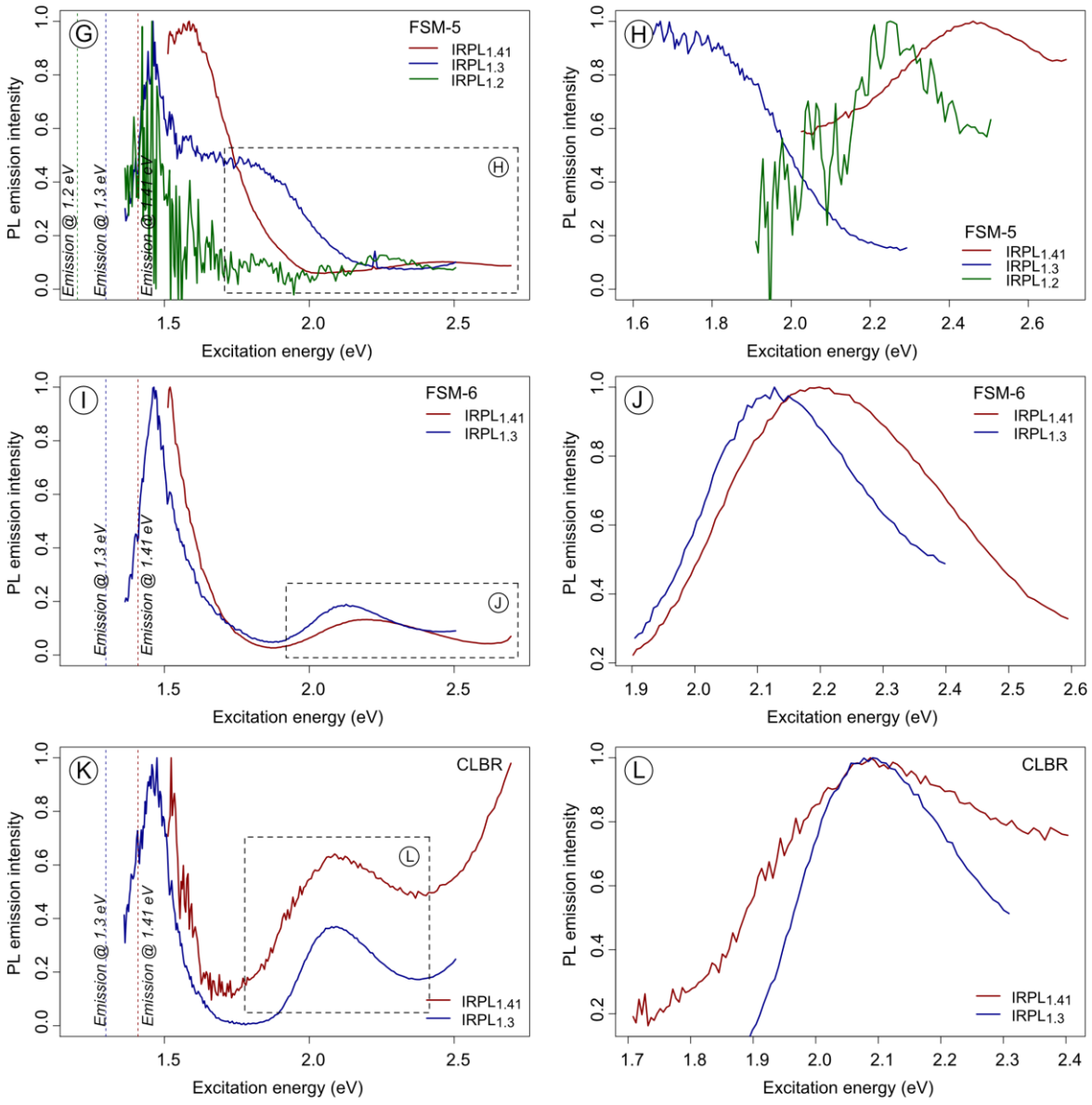

Fig. S3 (continued). Excitation spectra with $IRPL_{1.3}$ and $IRPL_{1.41}$ emission recorded for samples FSM-6 (I, J) and CLBR (K, L), and with $IRPL_{1.2}$, $IRPL_{1.3}$ and $IRPL_{1.41}$ emissions recorded for sample FSM-5 (G, H). The emission windows are indicated in G, I and K with vertical dashed lines. The graphs were normalised to the point of highest signal intensity. For figures H, J and L, excitation peak 2 was isolated and normalised separately. These graphs were used to obtain the trap depth of the principal dosimetric trap in feldspars, by picking the point of highest intensity for the individual curves. The thus obtained mode (in eV and µm) of the peaks are given in Table 3. For FSM-5 (G and H) excitation peak 2 overlaps with the IR resonance peak, which complicates the estimation of the trap depth in the case of the $IRPL_{1.3}$ emission of this sample. For CLBR the $IRPL_{1.41}$ emission is much dimmer than the $IRPL_{1.3}$ emission, which is due to the $IRPL_{1.41}$ emission being only the tail of the $IRPL_{1.3}$ emission. This also explains, why excitation peak 2 overlaps for both emissions. We therefore do not attempt to calculate a trap depth for the $IRPL_{1.41}$ emission of CLBR.