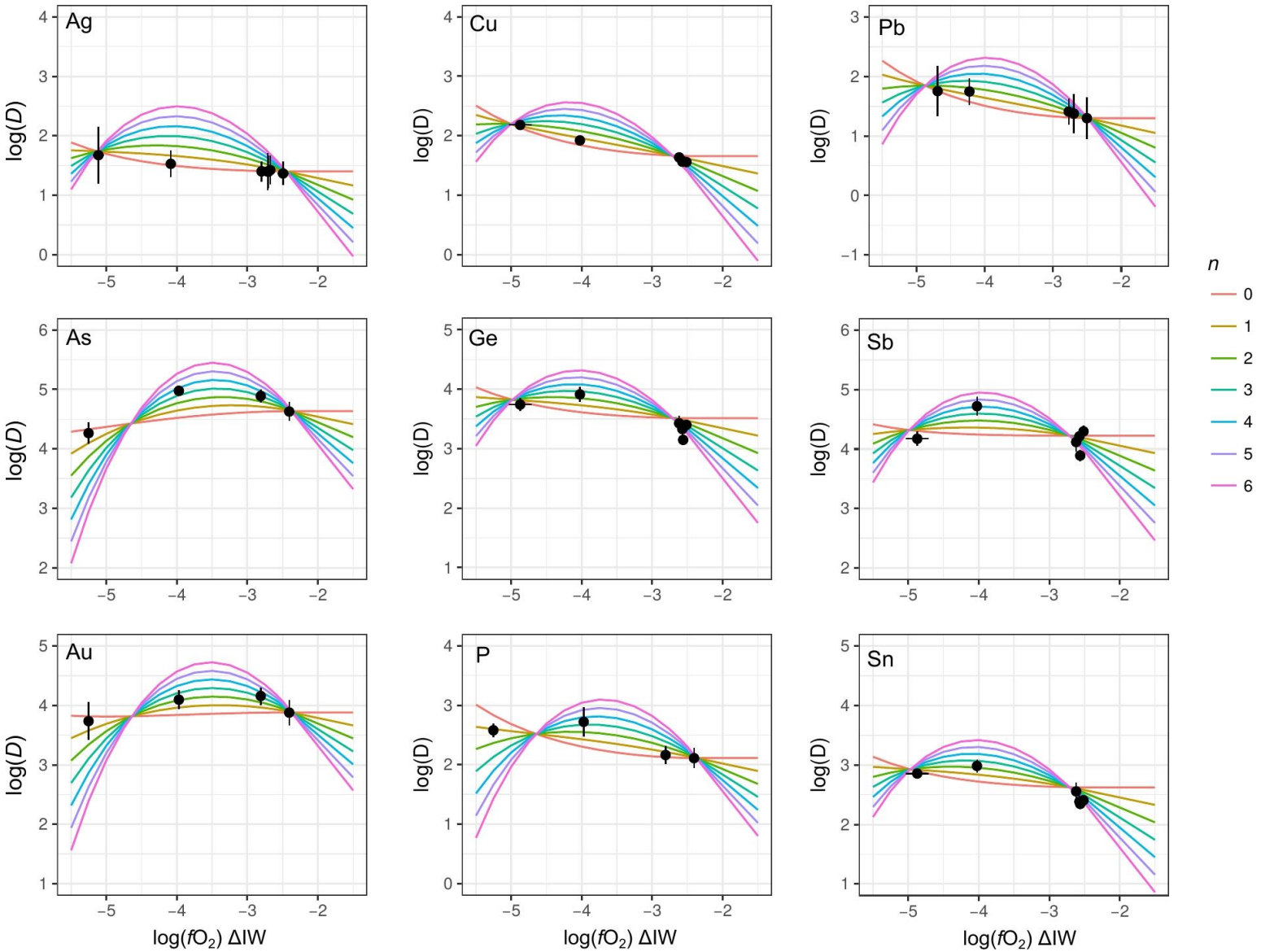

Fig. S1. log(D_M) as a function of ΔIW for all the elements that are not depicted in Fig. 5. Each curve is calculated for a different valence state *n*, indicated by the numbers on the left- or right-hand side of the graphs. The curves are predicted from X_{Si}, *n*, and the best-fit ε_M^{Si} for that particular valence state. X_{Si} is calculated from ΔIW according to the polynomial curve of Fig. 3, where $X_{Si} = 0$ above the fO_2 threshold shown by the vertical dashed line. $\Delta G°$ for each curve is calculated at 2600 K from the lowest X_{Si} experiment, meaning that all curves must intersect (or nearly intersect) at the highest ΔIW point by definition.