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**FIGURES**

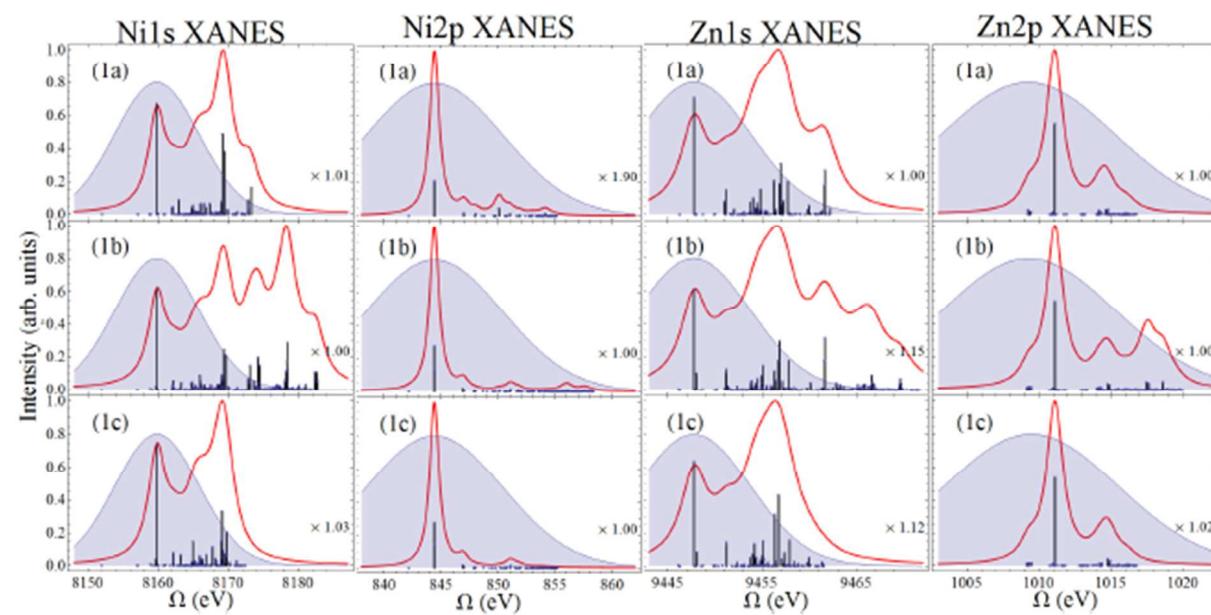


FIG. S1. Comparison of the nickel and zinc K- and L-edge XANES spectra for dimers 1a, 1b, and 1c. Shaded curves show the power spectra of the pulses used in the simulation.

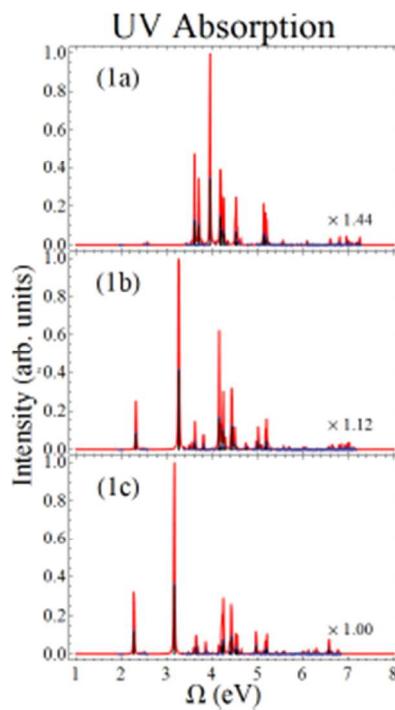


FIG. S2. Comparison of the valence absorption spectra for dimers 1a, 1b, and 1c.

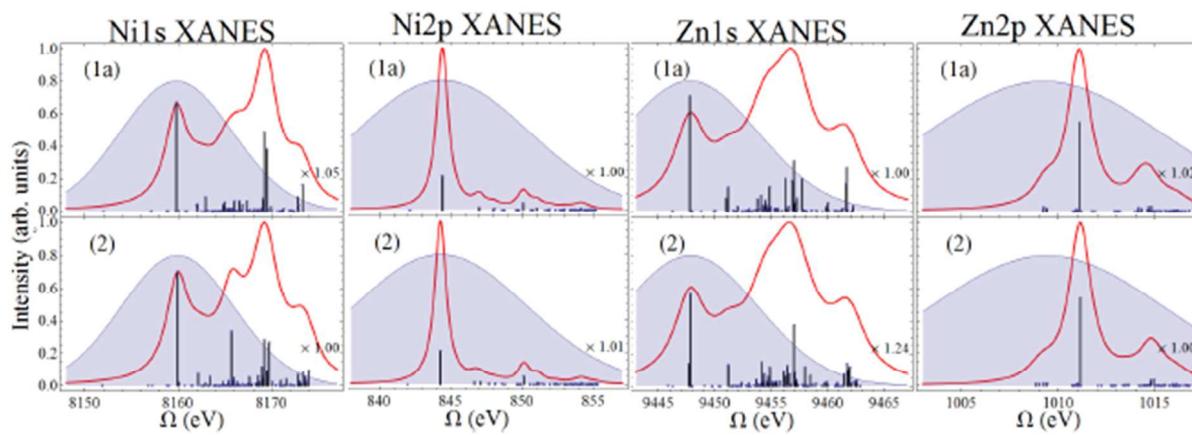


FIG. S3. Comparison of the nickel and zinc K- and L-edge XANES spectra for dimers 1a and 2.  
Shaded curves show the power spectra of the pulses used in the simulation.

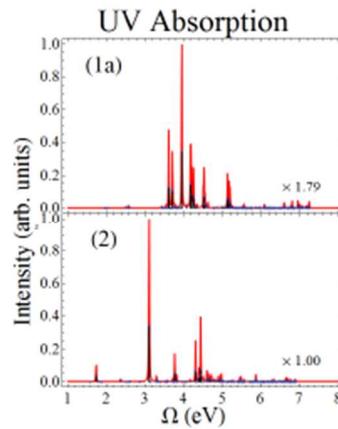


FIG. S4. Comparison of the valence absorption spectra for dimers 1a and 2.

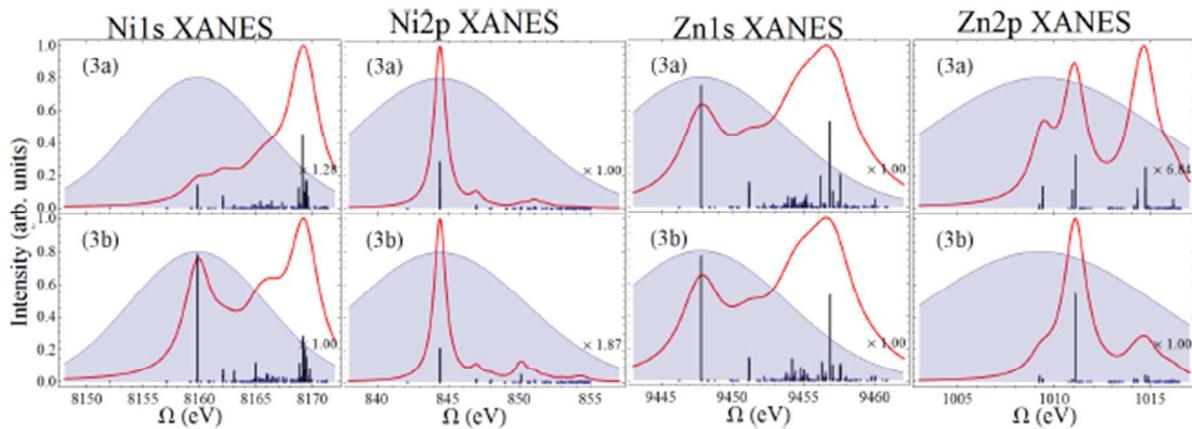


FIG. S5. Comparison of the nickel and zinc K- and L-edge XANES spectra for dimers 3a and 3b. Shaded curves show the power spectra of the pulses used in the simulation.

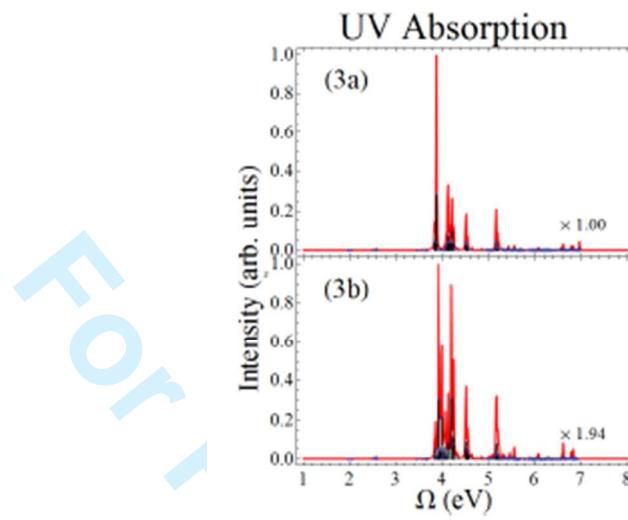


FIG. S6. Comparison of the valence absorption spectra for dimers 3a and 3b.

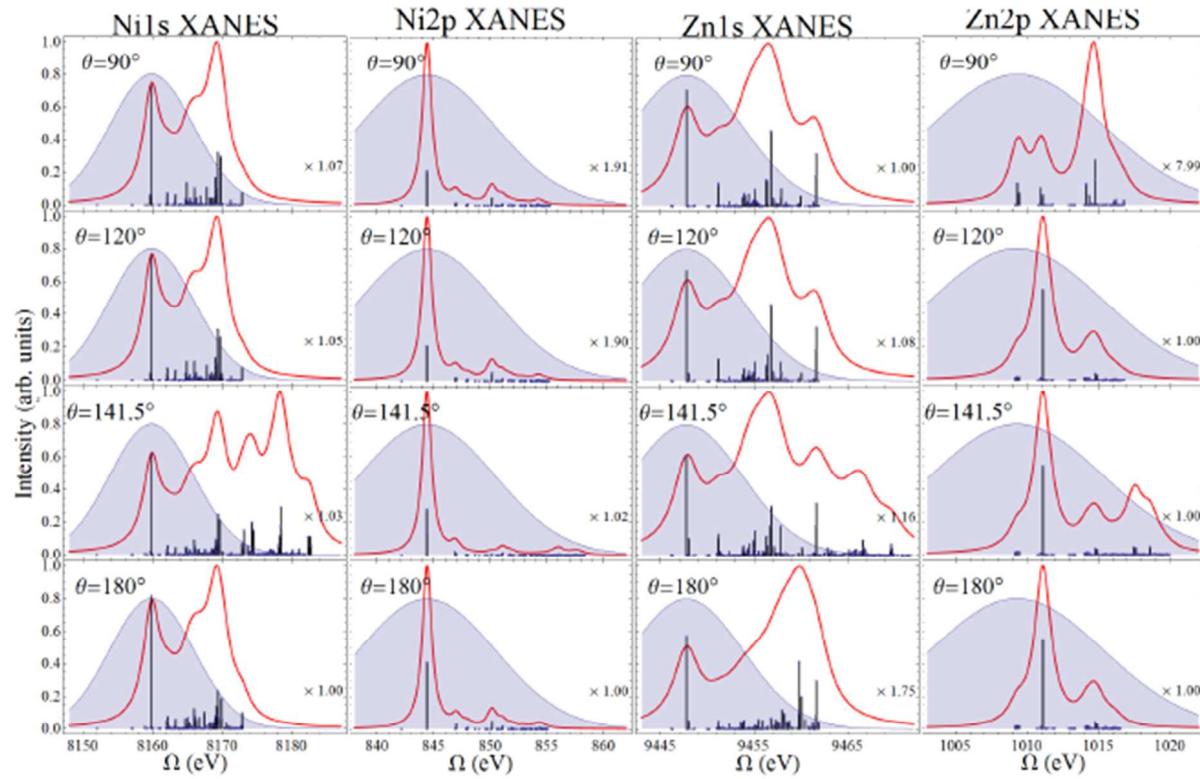


FIG. S7. Comparison of the nickel and zinc K- and L-edge XANES spectra for dimer 1b with four different intermonomer angles. Shaded curves show the power spectra of the pulses used in the simulation.

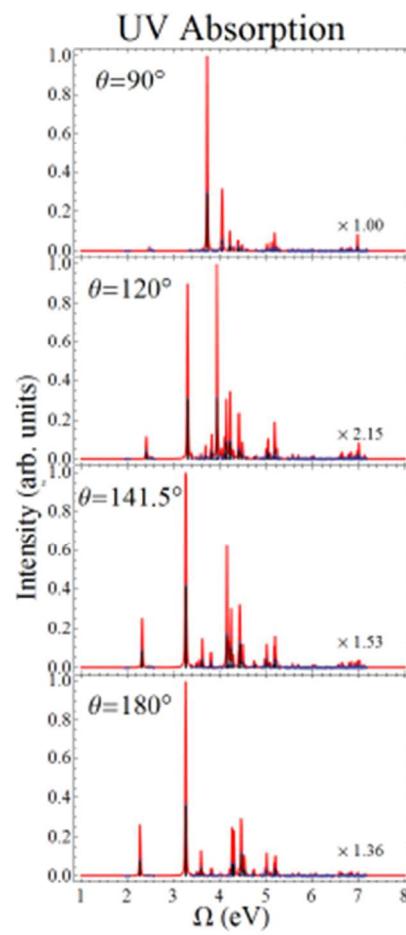


FIG. S8. Comparison of the nickel and zinc K- and L-edge XANES spectra for dimer 1b with four di\_erent intermonomer angles.