This exercise is designed to familiarize you with the possible bonding interactions of a variety of different orbitals, and in particular d-orbitals. You will need to draw the indicated orbitals for a hypothetical A-B compound. For each of the combinations below, assume that the orbital given in the column is on the left and the row is on the right.

a. sketch the orbitals with the appropriate relative orientation (assume that the z-axis is the bonding axis and horizontal within the plane of the paper). Generally, the x-axis is vertical within the paper, but you may reorient if necessary. Label your axes!!

b. If there is a net bonding interaction for the interaction of the two orbitals, indicate the overlap and classify the type of interaction (sigma, pi, delta).

c. If no net bonding interaction takes place, write “NO INTERACTION” under the drawing of the orbitals.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A/B | s | px | py | pz | dxy | dyz | dxz | dx2-y2 | dz2 |
| s |  |  |  |  |  |  |  |  |  |
| px |  |  |  |  |  |  |  |  |  |
| py |  |  |  |  |  |  |  |  |  |
| pz |  |  |  |  |  |  |  |  |  |
|  | s | px | py | pz | dxy | dyz | dxz | dx2-y2 | dz2 |
| dxy |  |  |  |  |  |  |  |  |  |
| dyz |  |  |  |  |  |  |  |  |  |
| dxz |  |  |  |  |  |  |  |  |  |
| dx2-y2 |  |  |  |  |  |  |  |  |  |
| dz2 |  |  |  |  |  |  |  |  |  |