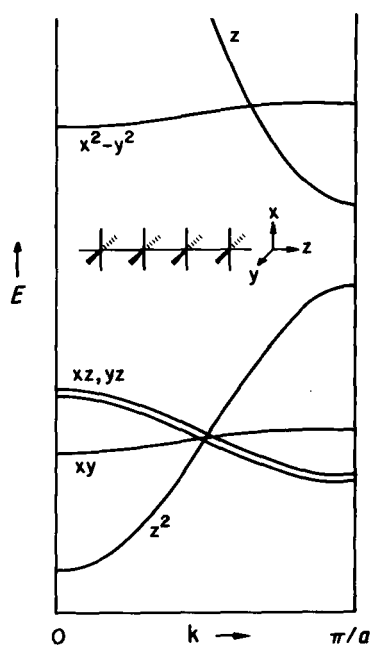
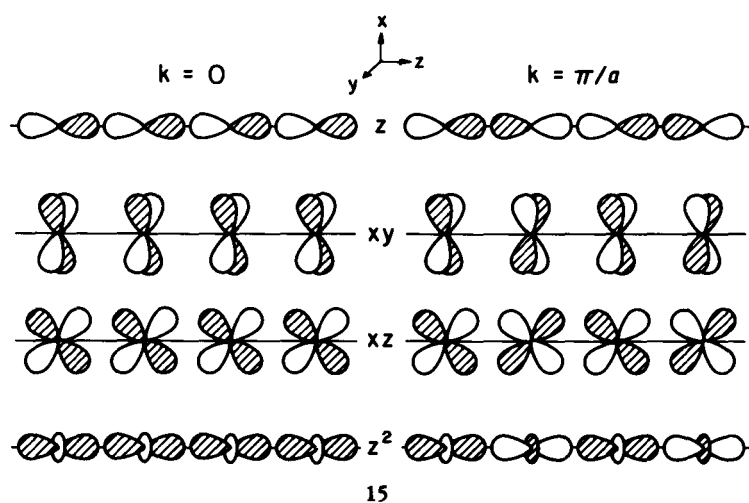


1. Rationalize how the bands form in the linear chain of the square planar $[\text{PtH}_4]^{2-}$ complex.



2. For the square lattice of H-atoms in the xy -plane, we saw in class the bands for s -orbitals. Extend the band dispersions to include the p_x and p_y orbital interactions too. Plot from $\Gamma \rightarrow X \rightarrow M \rightarrow \Gamma$

3. Identify the bands below. Draw the DOS in the right panel. The Fermi energy is marked for you.

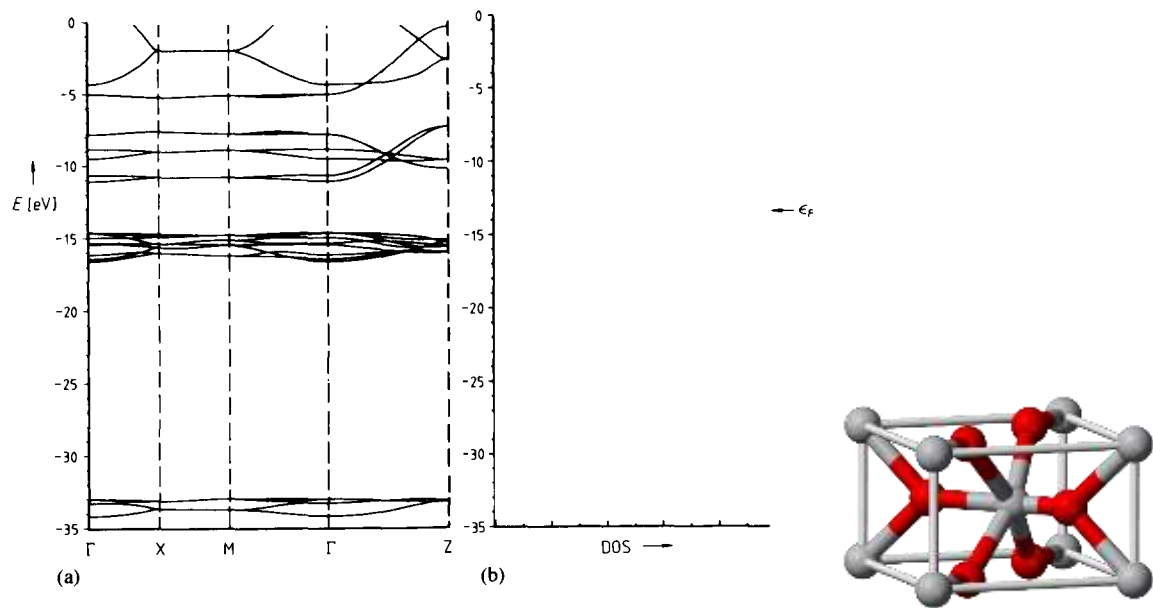


Figure 10 Band structure and density of states for rutile, TiO_2 .

1. Assume a situation where CO is bound to a metal surface through the carbon atom. Plot the dispersions ($\Gamma \rightarrow X \rightarrow M \rightarrow \Gamma$) for weak interaction between CO molecules. How would the dispersion change as the intermolecular interactions increase?