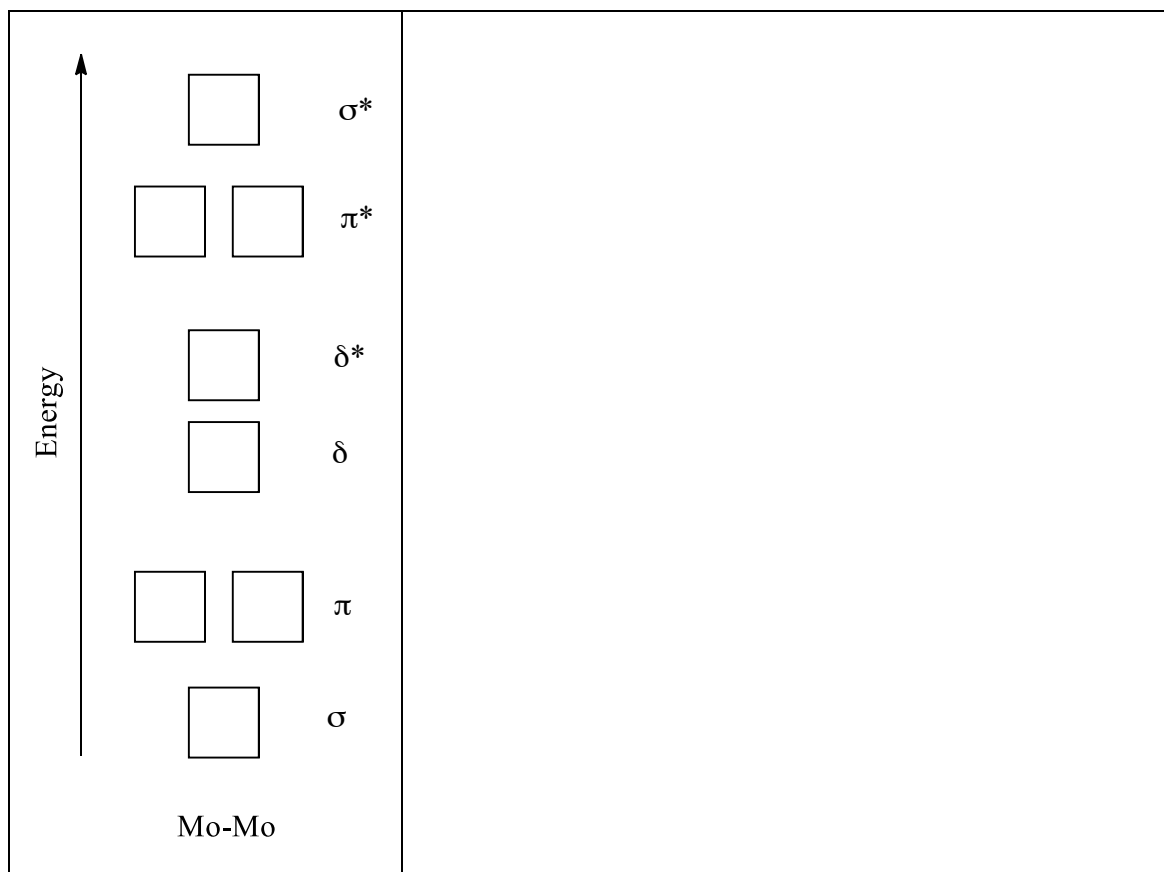


- The red species  $\text{K}_4[\text{Mo}_2\text{Cl}_8]$  is an historically important example of a metal-metal bonded complex. Use standard nomenclature to name the complex salt.

**Marks**  
**6**

$\text{K}_4[\text{Mo}_2\text{Cl}_8]$  possesses an extremely short Mo–Mo bond (214 pm), much shorter than the bonding distance between Mo atoms in Mo metal (273 pm)! Propose a reasonable explanation for the very short Mo–Mo bond length in the complex by adding *d*-electrons into the (partial) MO scheme shown below. Draw a structure for the complex that is consistent with the completed MO scheme and your explanation.



Oxidation of the complex by one electron gives rise to a paramagnetic species in which the Mo-Mo distance increases significantly. Propose a reasonable hypothesis for the bond lengthening phenomenon.