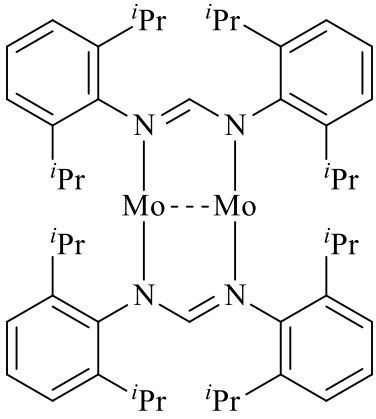
Marks 6

- In 2009, great excitement was generated amongst chemists worldwide with the report of a neutral Mo complex containing two bridging, anionic *N*-donor ligands. The structure of the complex is shown below. ^{i}Pr = isopropyl = $-CH(CH_3)_2$

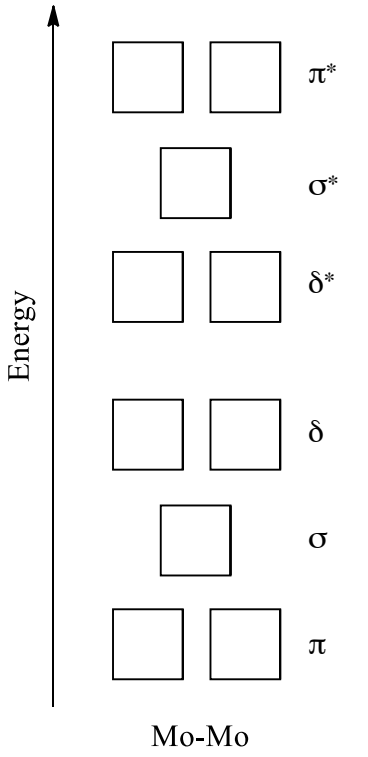


Name the complex by using standard IUPAC nomenclature. For simplicity, the name of the *N*-donor ligand (in its neutral form) can be shortened to "aminidate".

The Mo complex above possesses an extremely short Mo–Mo bond (202 pm), much shorter than the bonding distance between Mo atoms in Mo metal (273 pm)!

(a) 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.

(b) Determine the bond order for the metal-metal bond and re-draw the structure of the complex shown above indicating the actual bonding between the two Mo atoms.



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