**HYBRID BONDING**

Recall valence bond theory predicts that the two unpaired e− will form bonds by overlapping those p-orbitals. This contradicts the known fact that carbon atoms form 4 bonds.

energy

↑ ↑ \_\_

C ↑↓ 2p

2s

↑↓

1s

Linus Pauling revised the theory to suggest that one of the s-orbital e− moves to the empty p-orbital to allow 4 bonds to form. **Problem**: one of the bonds has a different shape and energy than the other three.

Hybrid Bonding

When bond energies are measured, scientists find all are equal, so theory must be modified again.

↑ ↑ \_\_ ↑ ↑ ↑ ↑

C ↑↓ 2p becomes C 2sp3

2s

All have same energy.

This only occurs in bonding.

An isolated atom has e− in regular energy levels and orbitals.