Quiz 13

Name:

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Question 1

Please provide a typical interplanar distance between stacked molecules in organic semiconductors.

Correction: A typical interplanar distance is equal to twice the van der Waals radius of carbon (1.7 Å), i.e. 3.4 Å. The smallest distances can be close to 3.1 Å and the larger ones close to 4.0 Å.

Question 2

Excitonic coupling gives rise to spectral shifts in the absorption bands of organic semiconductors. Please name 3 parameters, which determine the magnitude of the excitonic coupling energy J.

Correction:

- Transition dipole moment or absorption coefficient: $J \sim \mu^2 \sim \alpha$
- Distance r between molecules: : $J \sim r^{-3}$
- Orientation between molecules.

Question 3

Compare the electron mobility μ of crystalline organic semiconductors (OS) to the one of crystalline silicon (Si):

☐ $\mu_{Si} \approx \mu_{OS}$

☐ $\mu_{Si} \approx 50\ x\ \mu_{OS}$

☐ $\mu_{Si} \approx 1000\ x\ \mu_{OS}$

Correction: $\mu_{Si} \approx 1000\ x\ \mu_{OS}$