tablets (or compression coated tablets) are resorted to. In this case, the liquid will still ooze into the layer containing its interactant, but the process will be diffusion controlled. It can be shown (Jost, 1962) that the average concentration, C, of the liquid in the neighboring layer, with which it is in contact, is given by

$$\frac{C - C_f}{C_0 - C_f} = Qe^{-kt} \tag{6.91}$$

where C_f is the concentration at infinite time. The term on the right-hand side is actually the leading term of an infinite series.

13. REACTIONS VIA THE GAS PHASE

Sometimes the vapor pressure of a drug is sufficiently high that it may interact with other substances via the vapor phase. An example is ibuprofen (B). This is a Lewis acid, and it can interact with Lewis bases. Usual measures, such as e.g. triple-layer tablets, do not work in this case, since the interactant will be present in the gas phase.

If the reaction with another drug (D) is

$$\mathrm{D} + \mathrm{B} \rightarrow \text{decomposition} \tag{6.92}$$

then the initial reaction rate is given by

$$\frac{d\{D\}}{dt} = -kP_B[\mathrm{D}]A \tag{6.93}$$

where $\{D\}$ is the surface density of D molecules (number of molecules per cm^2) at time t, and A is the surface area. As long as there is no penetration into the crystals, the reaction will therefore be a first-order reaction, since Eq. (6.93) integrates to

$$\ln[C] = -kAP_B t + \ln[C_0] \tag{6.94}$$

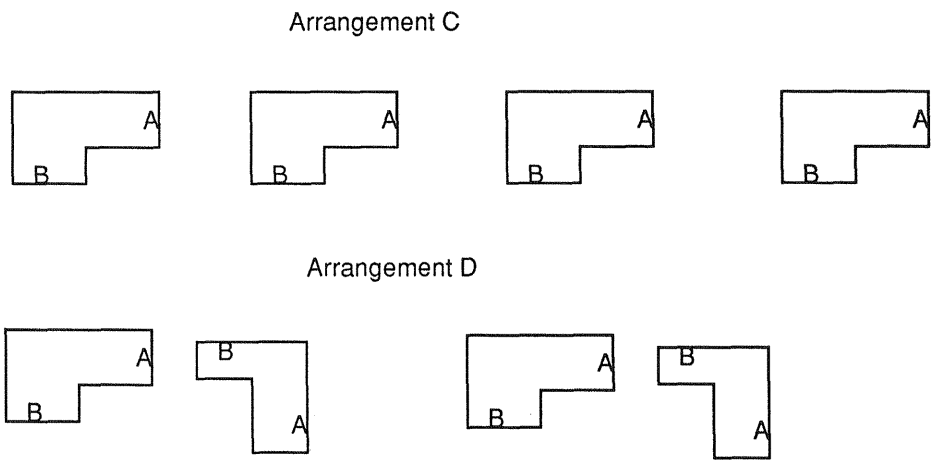

Fig. 24 Schematic of an example of molecular arrangement possibilities in a crystalline solid. If groups A and B can interact, then the situation in the upper arrangement is less prone to reaction, since A and B are at a greater distance.