Substrate unit cell
Adsorbate unit cell

Wood’s Notation

Substrate: fcc(100)

Substrate: fcc(110)

Substrate: fcc(111)
Substrate: fcc(100)

C(2x2)

(√2x√2)R45°

Substrate: fcc(110)

C(2x2)

Sometime primitive unit cell cannot be described using Wood’s notation. It is OK to use a centered unit cell description.
Substrate: fcc(111)

$(\sqrt{3} \times \sqrt{3})R30^\circ$
LOW ENERGY ELECTRON DIFFRACTION (LEED)

The symmetry of the diffraction pattern provides direct information about the symmetry of the surface atomic arrangement.

- $a) (\sqrt{3} \times \sqrt{3}) R30^\circ$
- $d) (3x3)$
- $b) (1x1)$
- $e) c(2x2)$ of $b)$
- $c) and f) (1x1)$

$\text{SiC}(0001)$

$\text{SiC}(10-10)$

$\text{SiC}(11-20)$

$E = 10 - 1000 \text{ eV}$

Absorption after a few net planes

⇒ only reflection from the surface

Experiments with UHV ($p < 10^{-8} \text{ Pa}$)

The symmetry of the diffraction pattern provides direct information about the symmetry of the surface atomic arrangement.
LOW ENERGY ELECTRON DIFFRACTION (LEED)

2D diffraction condition \( \Delta \vec{k}_\parallel = \vec{k}'_\parallel - \vec{k}_\parallel = \vec{G}_{hk} \); \( \parallel \) to surface

\[
\vec{k}'_\parallel = \vec{k}_\parallel + \vec{G}_{hk} \quad \Rightarrow \quad |\vec{k}'_\parallel| = |\vec{G}_{hk}| = \frac{2\pi}{a} \sqrt{h^2 + k^2}
\]

but \( k'_\parallel = |\vec{k}'| \sin(\pi - 2\theta) = \frac{2\pi}{\lambda} \sin 2\theta \)

\[
a = \frac{\lambda \cdot \sqrt{h^2 + k^2}}{\sin 2\theta}
\]

\( \lambda \rightarrow \text{known}, \quad 2\theta \text{ measured}, \text{then 'a' can be determined} \)