Kittel

2.3. Volume of primitive parallelepiped in Fourier space:

$$\vec{b}_1 \cdot \vec{b}_2 \times \vec{b}_3 = \frac{(2\pi)^3}{V_c^3} (\vec{a}_2 \times \vec{a}_3) \cdot (\vec{a}_3 \times \vec{a}_1) \times (\vec{a}_1 \times \vec{a}_2)$$

$$= \frac{(2\pi)^3}{V_c^3} (\vec{a}_2 \times \vec{a}_3) \cdot \vec{a}_3 \cdot (\vec{a}_1 \times \vec{a}_2) \cdot \vec{a}_1$$

$$= \frac{(2\pi)^3}{V_c^3} (\vec{a}_2 \times \vec{a}_3) \cdot V_c \cdot \vec{a}_1$$

$$= \boxed{\frac{(2\pi)^3}{V_c}}$$