SE produced as a result of interactions between primary beam and weakly bound conduction-band electrons in metals or outer-shell valence electrons in semiconductors and insulators.

<u>The SE coefficient δ</u> is defined as the ratio of the number of SEs emitted n_{SE} to the number of primary electrons n_{PE} bombarding the sample (or their equivalent currents i):

$$\delta = \frac{n_{\mathrm{SE}}}{n_{\mathrm{PE}}} = \frac{i_{\mathrm{SE}}}{i_{\mathrm{PE}}}$$

In general, δ is insensitive to atomic number Z (about ~0.1 for most elements, carbon ~0.05 and gold ~0.2).

because of so lower SE energies, excited electrons travel only short distances (a few nanometers), i.e. SEs that emerge from the sample must originate close to the top surface, to give <u>topographical information</u>.

$$p \approx \exp \frac{-z}{\lambda}$$

where λ = mean free path of SE, and the maximum depth of emission to be about 5λ