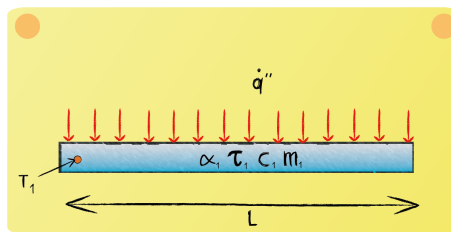# Energy Balance - Radiation - Transient 2

Setup the outer energy balance to compile a differential equation for the temporal variation of the homogeneous temperature T_1 of the square glass plate. The glass plate is a grey body, which is exposed to a radiative heat flux $\dot{q}''$.

As the sides are much smaller than the top and the bottom, radiation from here can be neglected.

Energy balance:

$$\frac{dU}{dt} = \dot{Q} - \dot{Q}_{1\tau} - \dot{Q}_{1\epsilon} - \dot{Q}_{1\rho}$$

Change of internal energy over time:

$$\frac{dU}{dt} = m_1 \cdot c_1 \cdot \frac{dT_1}{dt}$$

Heat fluxes:

$$\dot{Q} = \dot{q}'' \cdot L^2$$

$$\dot{Q}_{1\tau} = \tau_1 \cdot \dot{q}'' \cdot L^2$$

$$\dot{Q}_{1\epsilon} = 2 \cdot \epsilon_1 \cdot \sigma \cdot L^2 \cdot T_1^4$$

$$\dot{Q}_{1\rho} = \rho_1 \cdot \dot{q}'' \cdot L^2$$

Spectral properties:

$$\rho_1 = 1 - \alpha_1 - \tau_1$$

$$\epsilon_1 = \alpha_1$$