What is the freezing point of a solution of ethyl alcohol, that contains 24.3 g of the solute (C2H5OH), dissolved in 540 g of water?

$T=K*C_M$

$$C_M = \frac{\nu(C_2H_5OH)}{m(C_2H_5OH)+m(H_2O)}$$

$$C_M = \frac{\frac{m(C_2H_5OH)}{M(C_2H_5OH)}*1000}{m(H_2O)}$$

$$C_M = \frac{\frac{24,3*1000}{46}}{540} = 0,98 mol*kg^{-1}$$

$$\Delta T = (1,86 K*kg*mol^{-1})*(0,98*mol*kg^{-1}) = 1,83 K$$

$$T = T_0 - \Delta T$$

$$T = 273K - 1,83K = 271,17K$$

$$t = 271,17 - 273K = -1,83°C$$

Answer: T=271,17K t= - 1,83°C