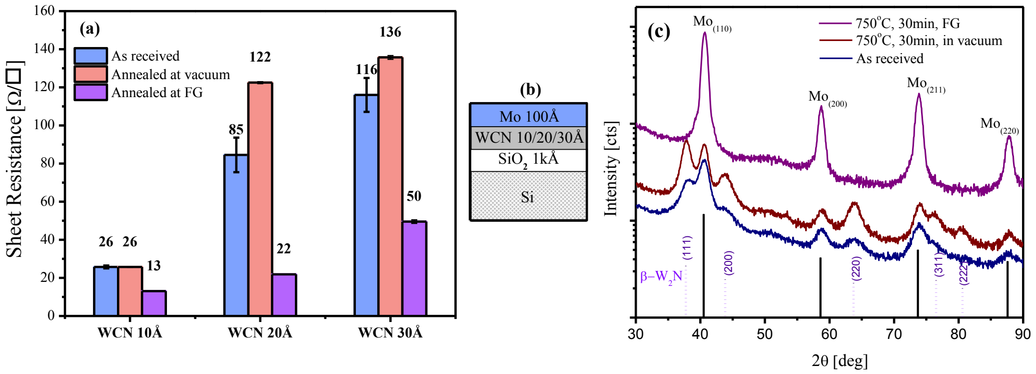

Fig. 1. (a) Sheet resistance change upon annealing at 750ºC for 30 minutes in FG (10%H_2, 90%Ar) and vacuum (10^{-6}torr) of SiO_2/WCN/Mo samples; (b) schematic illustration of the analyzed samples; (c) Glancing angle XRD of SiO_2/WCN 20Å/ Mo100Å sample. The reduction of sheet resistance upon FG annealing was attributed to BCC-Mo grain growth, annealing in vacuum induced grain growth of W_2N and oxidation of the sample, therefore the sheet resistance was increased.

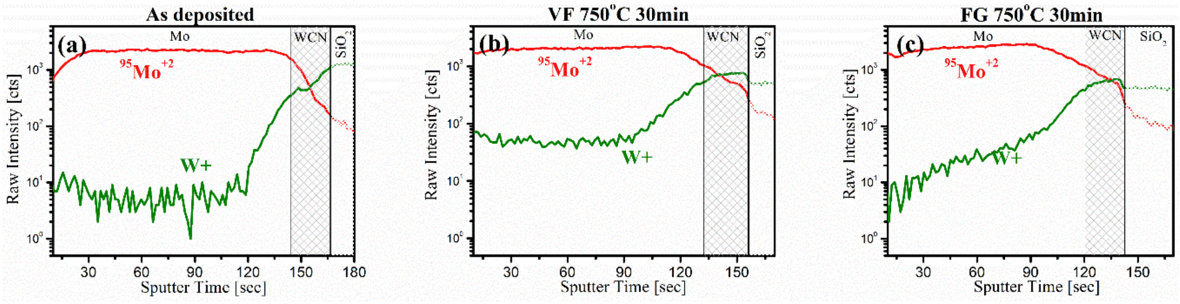

Fig. 2. ToF-SIMS depth profile comparison for (a) as deposited and (b) vacuum and (c) FG annealed SiO_2/WCN 20Å/ Mo100Å samples. Metal/dielectric interface of as deposited and annealed in vacuum samples is tungsten rich; annealing in FG led to Mo diffusion towards the interface.

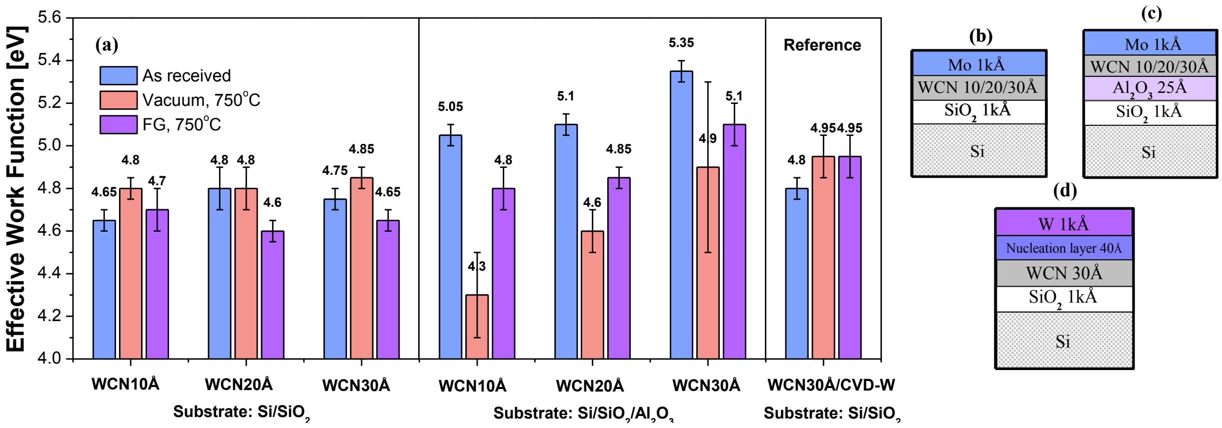

Fig. 3. (a) EWF change upon annealing ambient; analyzed samples schematic illustrations: (b) SiO_2/WCN/Mo, (c) SiO_2/Al_2O_3/WCN/Mo, (d) reference sample SiO_2/WCN/Nucleation layer/W. WCN liner defines the EWF of as deposited samples on SiO_2 and Al_2O_3 dielectrics. Annealing in vacuum stabilized the EWF on 4.8eV for SiO_2/WCN/Mo samples, but caused a deterioration of metal/dielectric interface properties and a severe EWF reduction for SiO_2/Al_2O_3/WCN/Mo samples. FG annealing SiO_2/WCN/Mo and SiO_2/Al_2O_3/WCN/Mo samples and led to Mo grain growth and diffusion towards metal/dielectric interface that caused the EWF reduction.