

Figure 1: Sulfur to tantalum ratio as function of the H₂ flow ratio. The total H₂ + H₂S flow is 10 sccm. No addition of H₂ leads to a TaS₃ film, while a 50% H₂ flow ratio leads to a TaS₂ film.

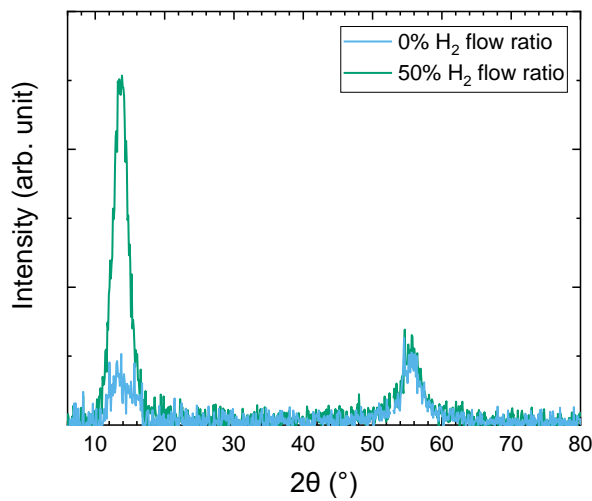


Figure 2: X-ray diffraction spectra of 0% H₂ flow ratio (TaS₃) and 50% H₂ flow ratio (TaS₂), indicating that first is amorphous and latter is crystalline. The peak at 56° originates from the Si substrate.

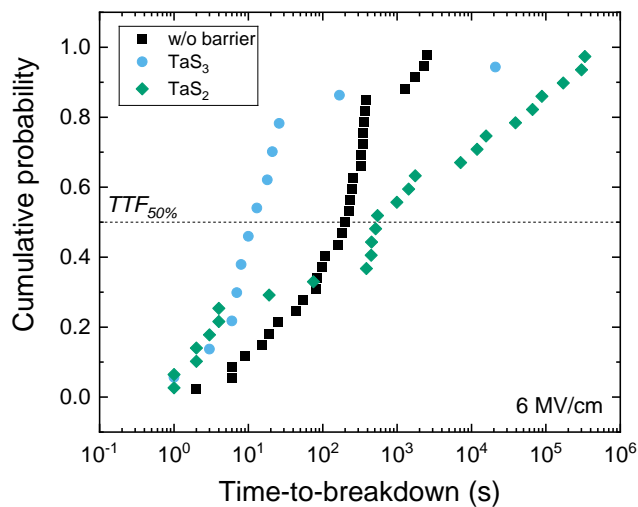


Figure 3: Cumulative probability plot for the time-to-breakdown resulting from time-dependent dielectric breakdown measurements of samples without barrier, with amorphous TaS₃ barrier and with crystalline TaS₂ barrier. The mean time-to-failure ($TTF_{50\%}$) is used as a quantitative measure for the barrier performance.