

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Influence of Ta doping in resistive switching behavior of TiO₂
ARABINDA BARMAN, CHETAN P SAINI, SUJIT DESHMUKH, SANKAR DHAR, ALOKE KANJILAL, Shiv Nadar University — An approach has been made to understand the resistive switching behavior in Ta-doped TiO₂ films on Pt substrates. Prior to thin film deposition, Ta-doped TiO₂ powder has been synthesized chemically using Ta and Ti precursor solutions. However, the Ta doping has seriously been affected by increasing Ta concentration above 1 at% due to the segregation of Ta₂O₅ phase. The Ta-doped TiO₂ targets have been prepared for pulsed laser deposition of the films on Pt substrates using an excitation wavelength of 248 nm. The structural and chemical properties of the Ta-doped TiO₂ films have been investigated in details with the help of XRD, SIMS, XAS and XPS. The stoichiometry of the Ta-doped TiO₂ films with increasing depth has been verified initially by SIMS. The electrical study of the corresponding device structures further suggests that the optimized resistive switching effect can be accomplished up to a threshold Ta-doping of 1 at%. Nevertheless, a highly conducting behavior has been shown when the TiO₂ films are doped with 2 at% Ta. These results will be discussed in details in the light of defect induced resistive switching phenomenon.

Arabinda Barman
Shiv Nadar University

Date submitted: 06 Jan 2017

Electronic form version 1.4