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Enhancement Of Indium Tin Oxide Nano-Scale Films For Terahertz Device Applications Treated By Rapid Thermal Annealing

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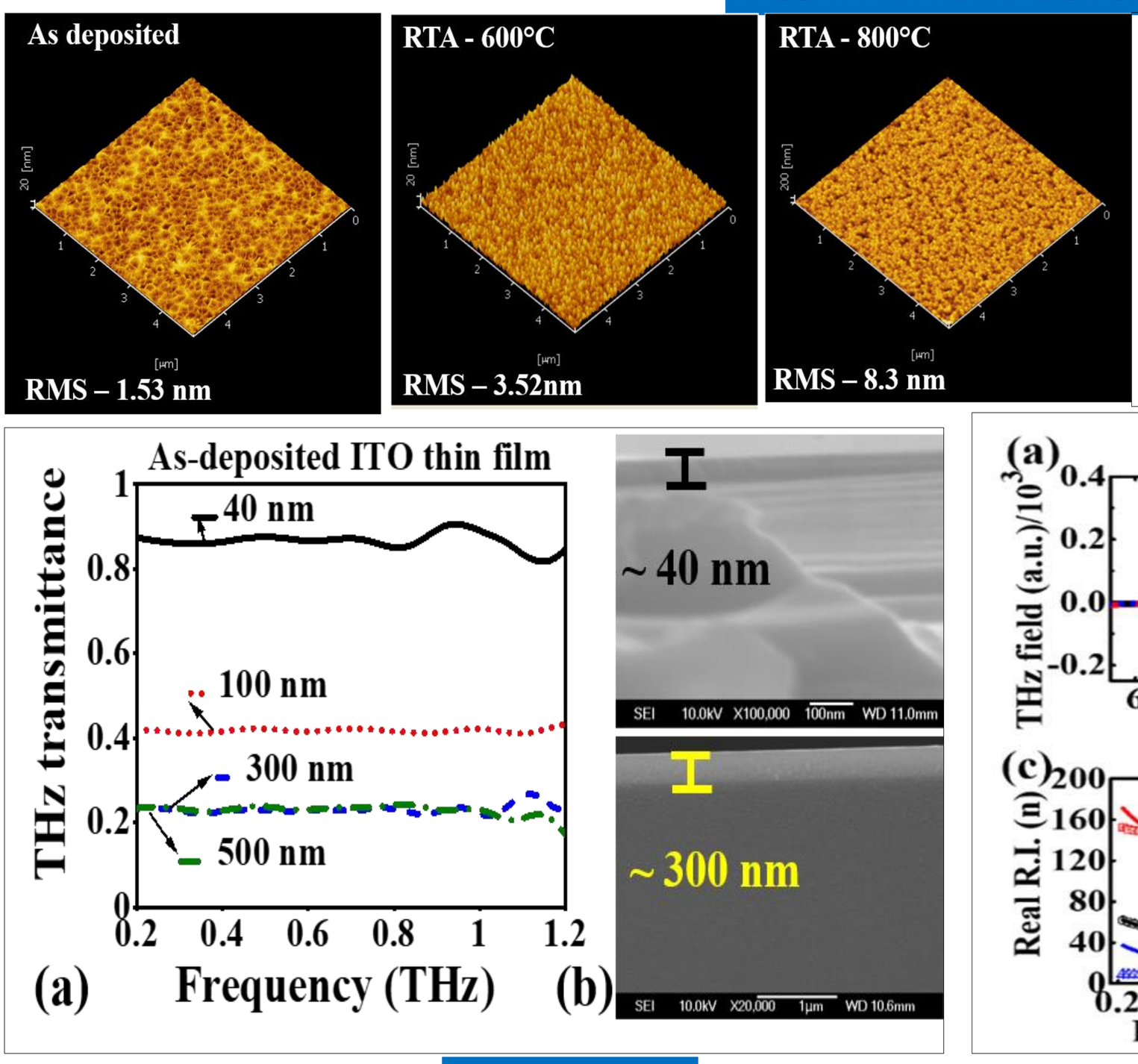
Motivation

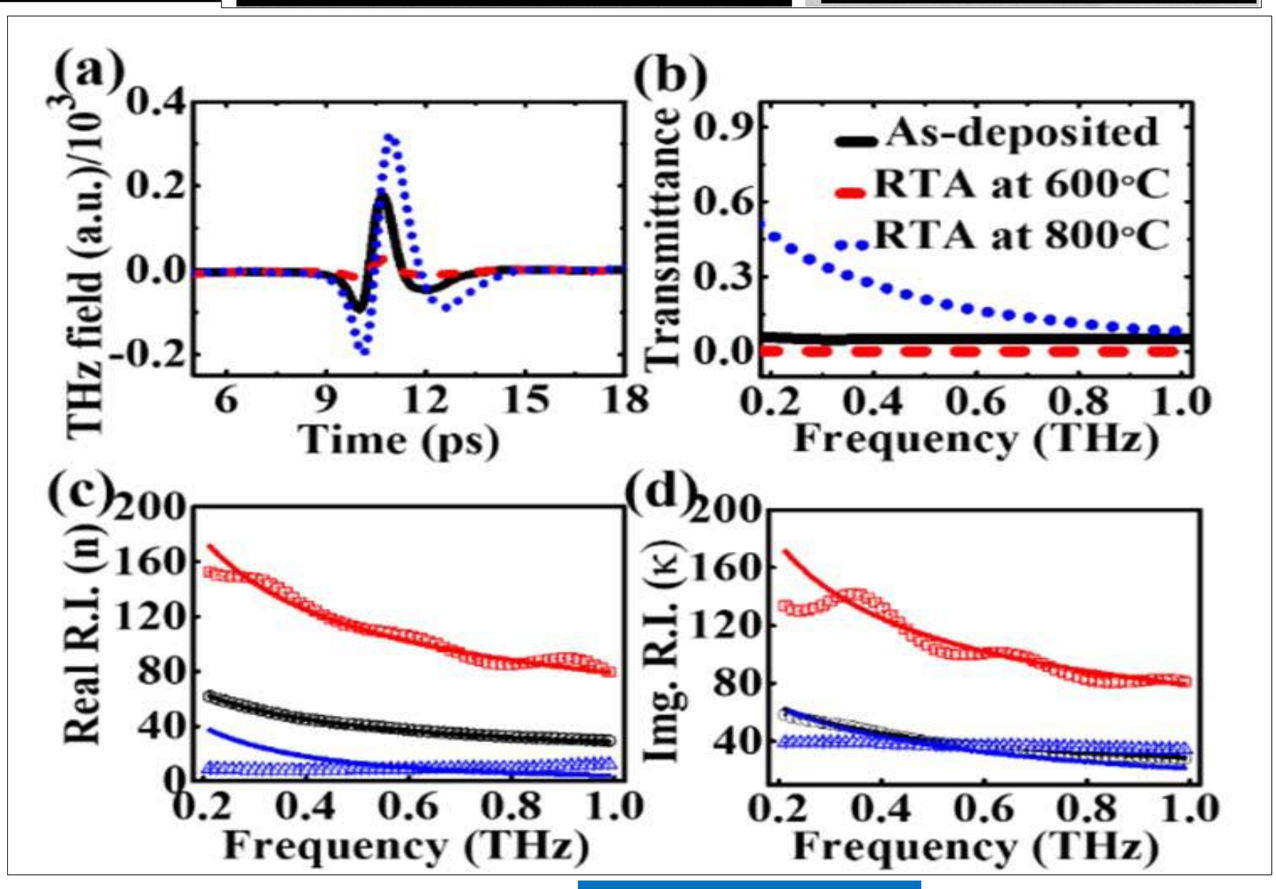
- Evaluated the terahertz (THz) optical and electrical properties of ITO nano-thick film treated by RTA
- Displayed the THz transmittance of different thickness ITO film.
- The ITO film can be functioned as a THz reflective conductive electrodes by RTA at 600°C
- Enhanced THz power transmittance from 6 to 49 % at 0.2 THz by RTA at 800°C.

Introduction

- **THz-TCEs:** graphene, poly(3,4-ethylenedioxythiophene) polystyrene sulfonate and (PEDOT: PSS).
- **THz-TCEs:** Drawbacks in conductivity and lithography process
- **ITO or Metal finger type pattern:** highly sensitive to polarization
- **Requirement:** polarization insensitive, highly conductive and THz transparent electrode for tunable THz devices, Ex. LC-SLM.
- Perhaps, RTA is one of simple way to produce highly efficient either transparent or reflectance electrode.

Result and discussions





Conclusions

- We showed that ITO nano films RTA-annealed at 600°C and 800°C are suitable as perfect absorbers and half-mirrors or electrodes, respectively.
- Analyzed electrical properties of as-deposited and RTA treated by using Drude model.
- The annealing condition further need to be optimizing for enhancing THz transmittance in the frequency range of 0.2-1.2 THz.

References

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