

# Combustion synthesis of ZTO nanostructures

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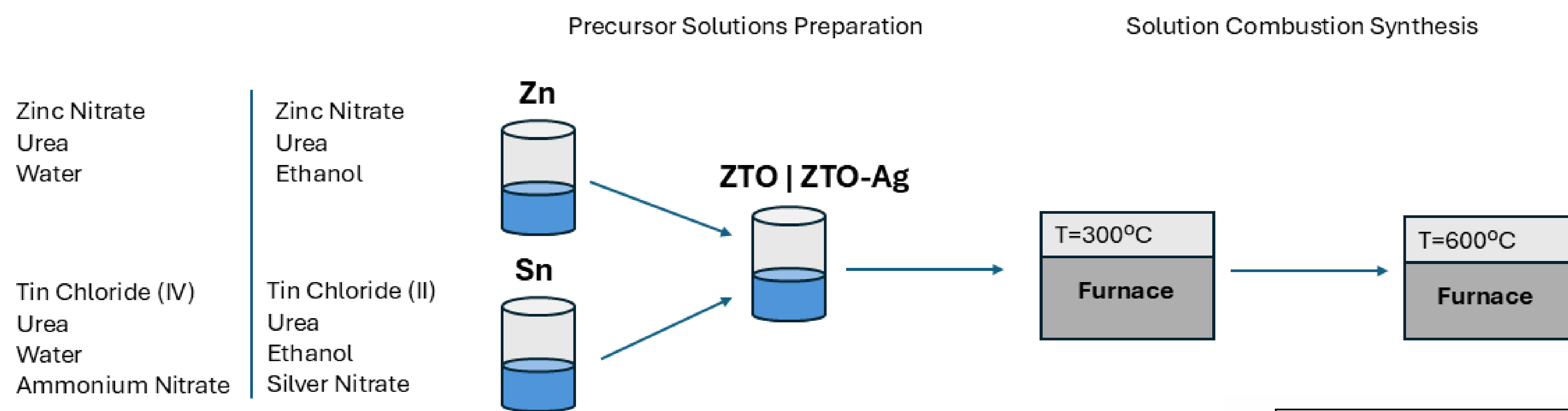
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## Introduction

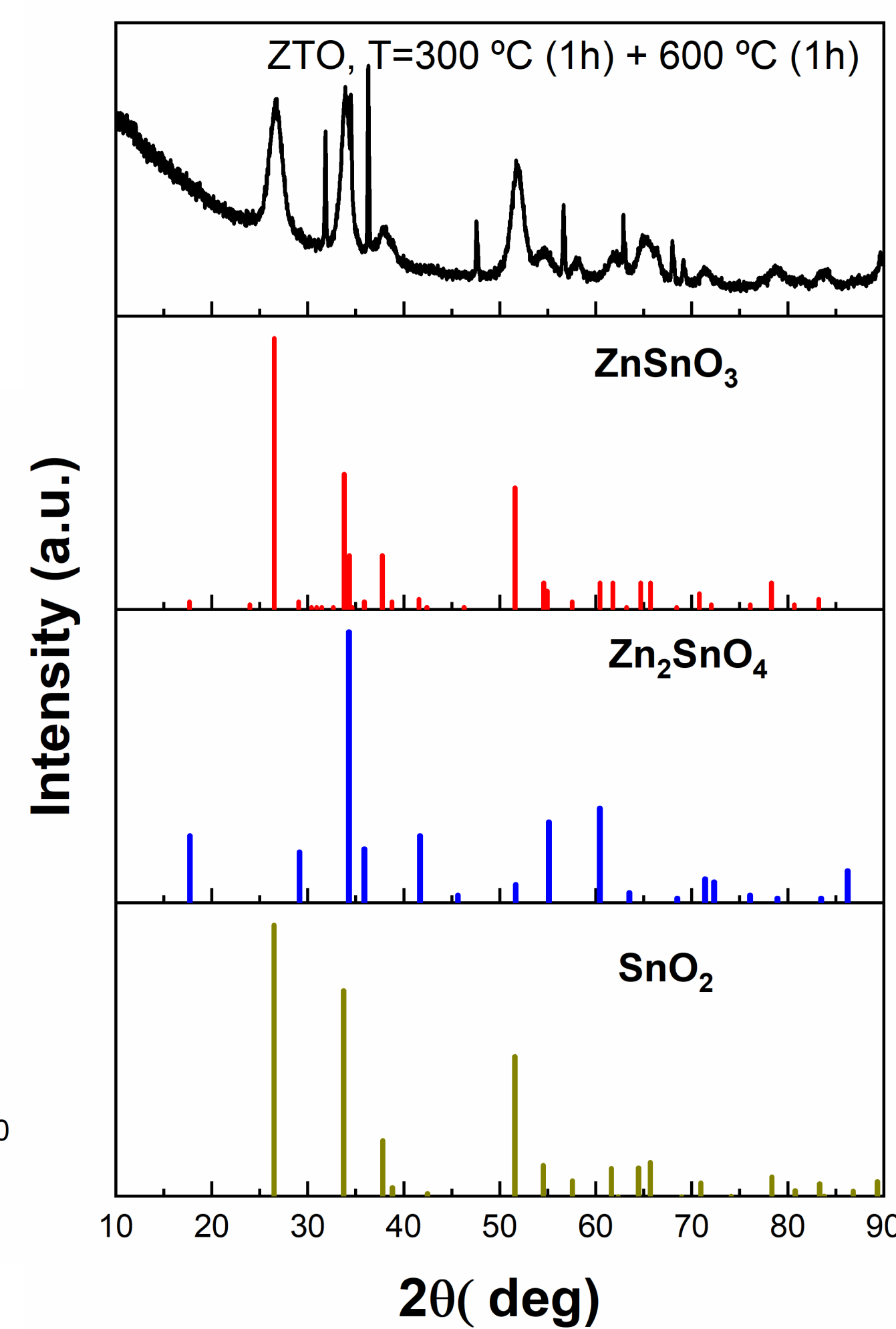
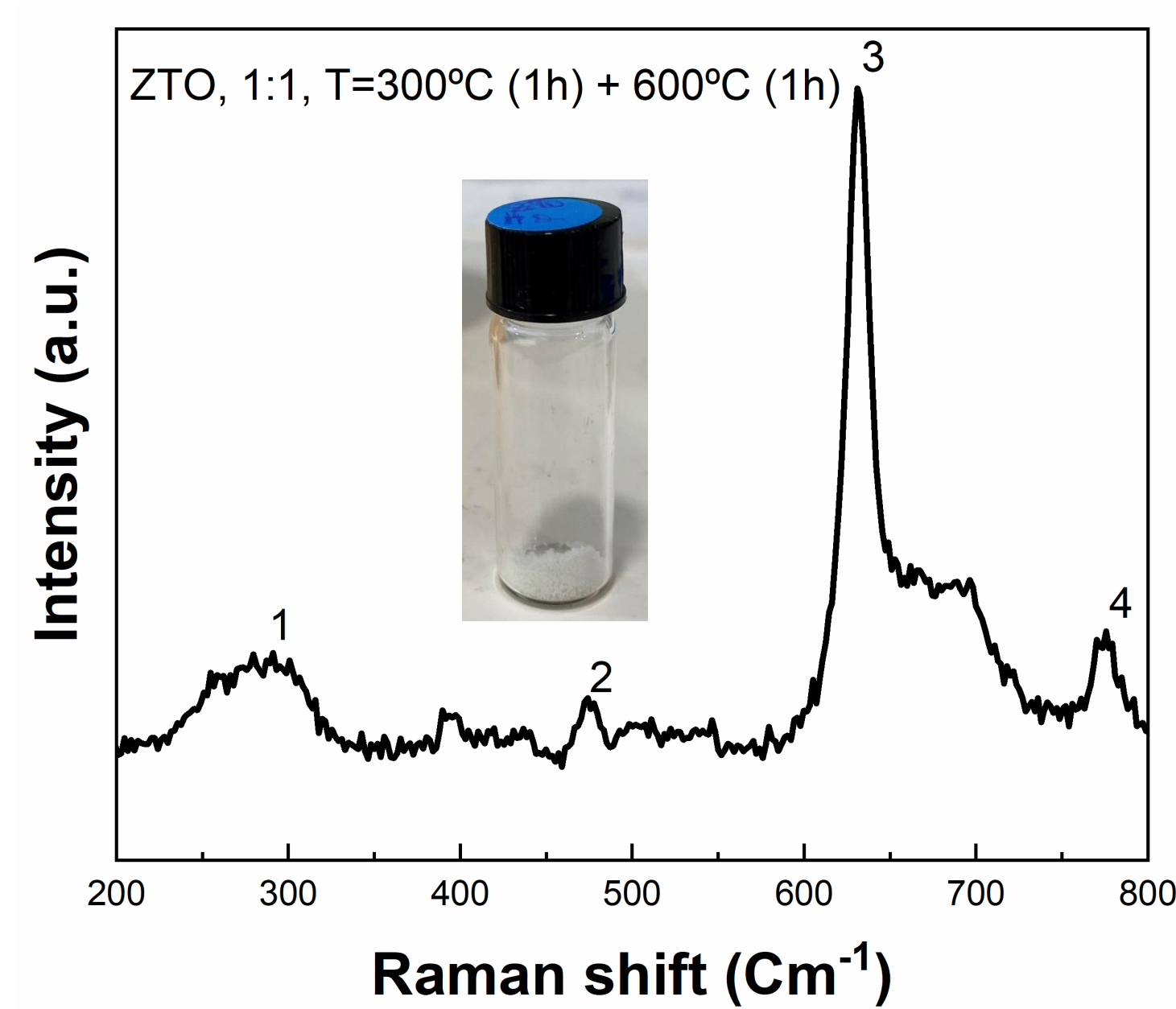
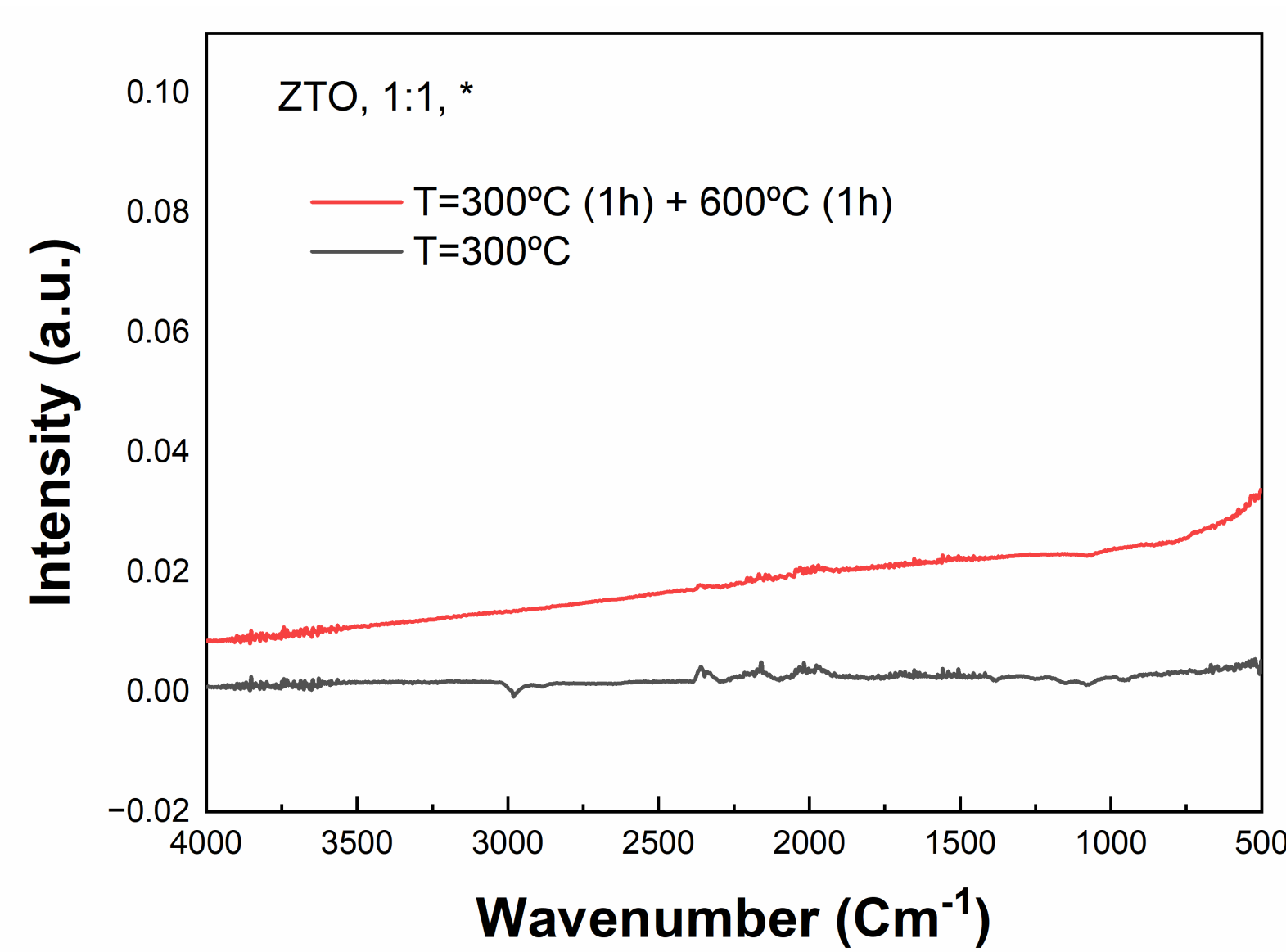
ZTO (zinc tin oxide), has attracted much attention has a green alternative to typical semiconductor technologies. Although it has a variety of applications, typical production processes of ZTO (vapor-based depositions and hydrothermal) are still complex and evolve high pressures and long reaction times [1] [2]. Solution combustion synthesis (SCS) is a great candidate to reduce the complexity of producing ZTO nanoparticles [3]. Doping ZTO with silver brings interesting advantages for electronic applications. The influence of Zn:Sn ratio, annealing temperature and Ag-doping % on the properties of SCS ZTO nanopowders is presented.

## Methods

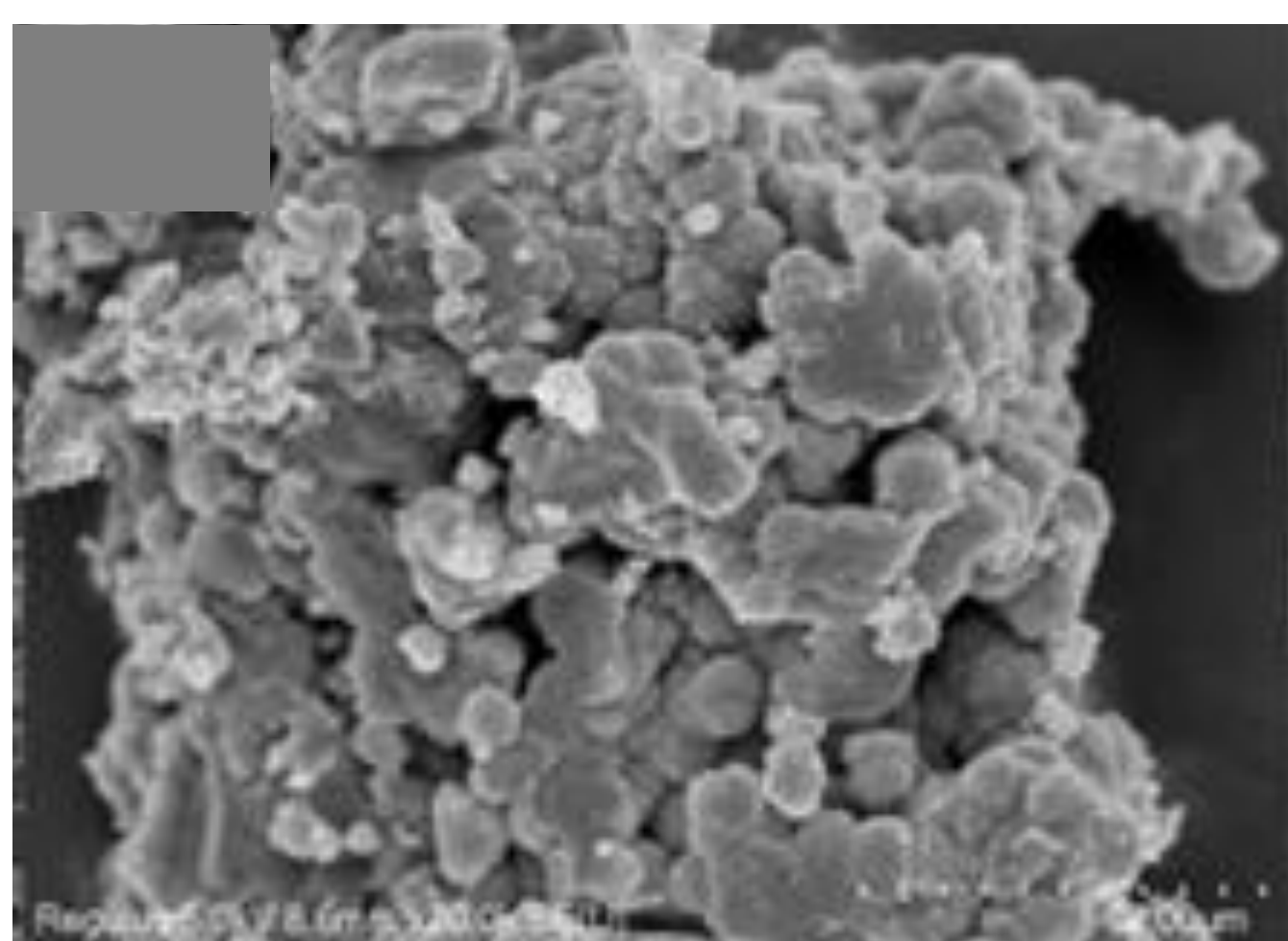


## Results

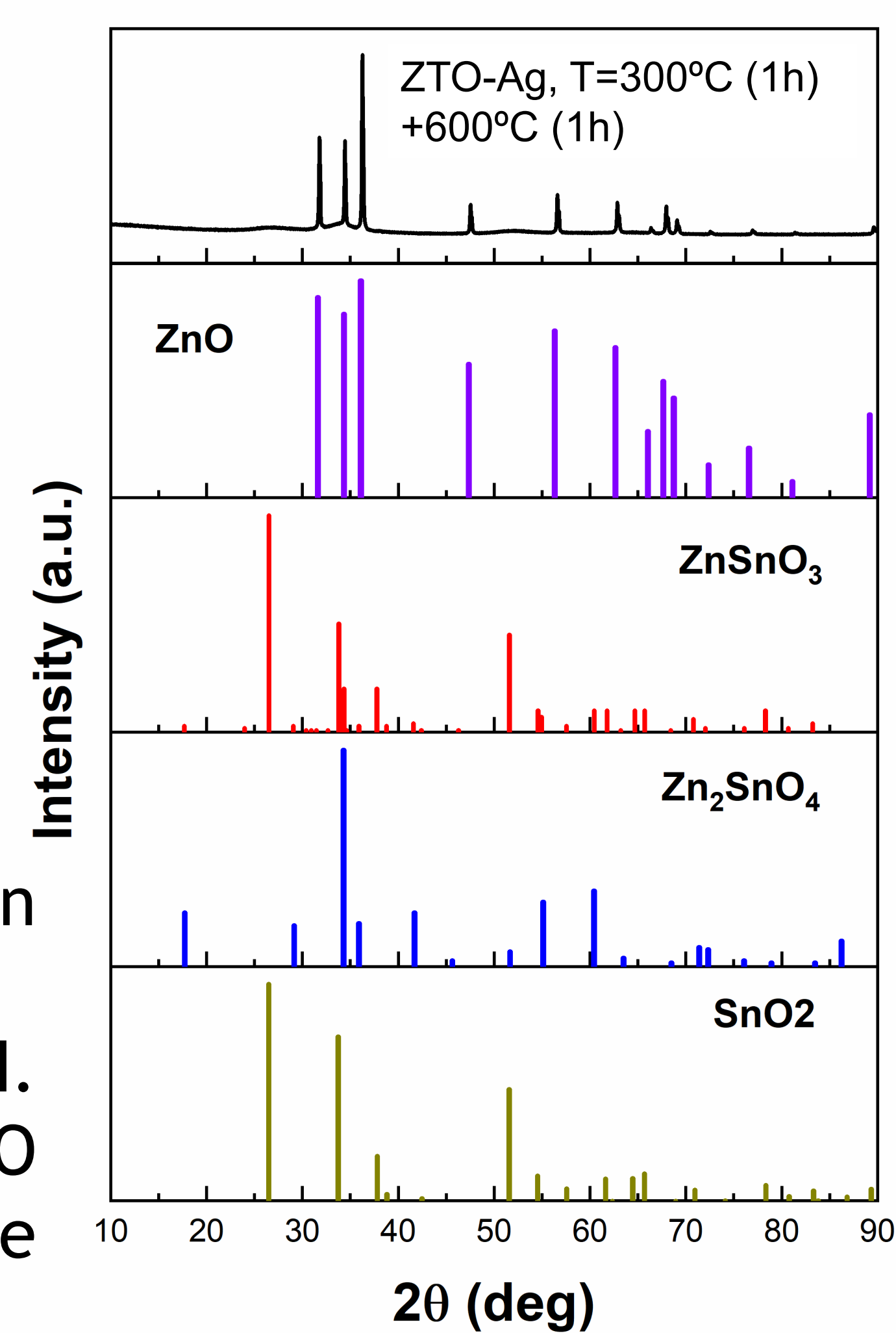
### Solution combustion synthesis of ZTO



### Ag doping of SCS ZTO



EDS	
Element	Atomic %
C	67.69
O	23.09
Cl	0.05
Zn	6.06
Ag	0.28
Sn	2.83



## Conclusions

XRD and Raman analysis confirm a mixture of several phases in both ZTO and ZTO-Ag samples including ZnO, SnO<sub>2</sub>, and ZnSnO<sub>3</sub>. The Zn:Sn ratio in the Ag-ZTO nano powders was confirmed. Although further work is required to optimize ZTO and Ag-ZTO properties, solution combustion synthesis is a reliable alternative method to produce ZTO nanostructures.

## References

- [1] A. Rovisco *et al.*, "Seed-layer free zinc tin oxide tailored nanostructures for nanoelectronic applications: Effect of chemical parameters," *ACS Appl Nano Mater*, vol. 1, no. 8, pp. 3986-3997, Jul. 2018, doi: 10.1021/acsanm.8b00743
- [2] Lead-free nanogenerator made from single ZnSnO<sub>3</sub> microbelt," *ACS Nano*, vol. 6, no. 5, pp. 4335-4340, May 2012, doi: 10.1021/nn300951d.
- [3] E. Carlos, R. Martins, E. Fortunato, and R. Branquinho, "Solution Combustion Synthesis: Towards a Sustainable Approach for Metal Oxides," Jul. 27, 2020, Wiley-VCH Verlag. doi: 10.1002/chem.202000678.