SAPIENZA
UNIVERSITÀ DI ROMA

AVVISO DI SEMINARIO

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MICROWAVE DRIVEN GROWTH ON Si OF α-Sn NANOPARTICLES WITH NARROW, DIRECT BANDGAP

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ABSTRACT. A microwave-driven synthetic route for the preparation of Sn nanospheres with a diamond-like α-phase structure on silicon is presented. The main characteristics of the synthesized material are an extraordinarily narrow (~50 meV) direct bandgap and an improved thermal stability (up to 200° C). Structural and compositional characterizations showed a core-shell structure comprised of an outer amorphous oxide shell and an inner core containing α-Sn domains. Microwaves can be instrumental in achieving the specific nanostructures, due to their peculiar heating characteristics. Such nanostructures are versatile building blocks for silicon compatible infrared detectors, sensors and emitters, with applications in free-space communication, infrared energy harvesting, biological and chemical sensing, thermal imaging. Being the proposed microwave driven synthesis a large-scale, low-temperature process, compliant with the electronic integrated circuits (IC) technology, it can play a significant role in implementing a new generation of cost-effective mid/far-IR platforms.

BIO. Ivan Mazzetta received the Bachelor Degree in Electronics Engineering (2014) and the Master Degree in Nanotechnology Engineering (2017) at the Sapienza University of Roma. In 2018 he was an Assignee at the Department of Information Engineering, Electronics and Telecommunication of the same University. In December 2021 he finished his PhD Course in Information Engineering. Since January 3 2022 he is with Infineon Padova, where he is now Senior Specialist Product Engineer, working on non-volatile memories.