



Call for Papers
for a Special Issue of
IEEE Transactions on Electron Devices
on
**“Low Temperature Processing
of Electronic Materials for Cutting Edge Devices”**

Early-day electron devices and circuits were typically synthesized of only one, or just a few, materials, so that few thermodynamic constraints were placed upon their processing, essentially temperature and time of specific processes. Through the years, temperature was largely unbounded, so that more perfect crystalline materials with enhanced properties could be exploited.

But now, most devices and circuits have matured to include a myriad of materials and elements on the Periodic Table. So, their coexistence in the same device, or in the same circuit, presents severe thermodynamic constraints, principally temperature. This is further exacerbated when devices are scaled below 20 nm, and critical features are often below 7 nm. At these ultra-scaled dimensions, interactions, even if minute, between dissimilar materials can be deleterious to device performance.

Similar thermal budget limitations are imposed for electronics placed atop flexible substrates. Taking this same overarching temperature constraint to large-scale circuits, such as Internet-of-Things (IoT) objects and wearables, presents a further set of inhibiting limitations upon process temperatures in order to accommodate flexible substrates, such as plastics and paper.

This unique special issue will not focus upon one specific material system, or one specific device topology, but instead it aims to bring a wide range of materials and devices under one tent that all share in common their unique temperature-constrained processes. In this way, different communities may benefit from the cross pollination of ideas, driven by the same thermodynamic limitation of temperature and time.

The innovations we desire to capture in this Special Issue are essentially any novel process(s) that attempts to push the processing temperature lower by 50-100 °C, or more, than their conventional counterparts. To bring clarity to this wide field, this issue will band the innovations into three temperature windows: (1) below 200 °C, (2) 200-500 °C and (3) above 500 °C, since these innovations are all relative.

This Special Issue of the IEEE Transactions on Electron Devices will feature the most recent developments and the state-of-the-art in the field of electronic, optoelectronic, and sensor devices based on ultra-low temperature processing. Papers must be new and present original material that has not been copyrighted, published or accepted for publications in any other archival publications, that is not currently being considered for publications elsewhere, and that will not be submitted elsewhere while under considerations by the Transactions on Electron Devices. Additionally, some selected invited papers will be solicited over the range of topics and the three temperature windows expressed here to capture innovations well known to the Guest Editorial staff.

Topics of interest include, but are not limited to:

- ◆ Ultra-scaled CMOS and Memory Technologies
- ◆ Monolithic 3D integration
- ◆ Memory/BEOL
- ◆ 3D packaging and system-on-chip technologies,
- ◆ Organic and 2-D Electronics
- ◆ Smart Textiles
- ◆ Paper Electronics
- ◆ Flexible and Wearable Electronics
- ◆ Sensors
- ◆ Bioelectronics
- ◆ Hybrid Integration strategies of dissimilar materials
- ◆ Heterogeneous or hybrid integration of different semiconductors through wafer bonding, , such as III-V optoelectronics on a Si-photonic platform

Submission instructions:

When submitting your manuscript through the IEEE's web-based ScholarOne Author Submission and Peer Review System (<https://mc.manuscriptcentral.com/ted>), please indicate that your submission is for this special issue.

Manuscripts should be submitted in a double column format using an IEEE style file. Please visit the following link to download the templates:

http://www.ieee.org/publications_standards/publications/authors/author_templates.html

Submission deadline: November 1, 2020

Publication date: July 2021

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