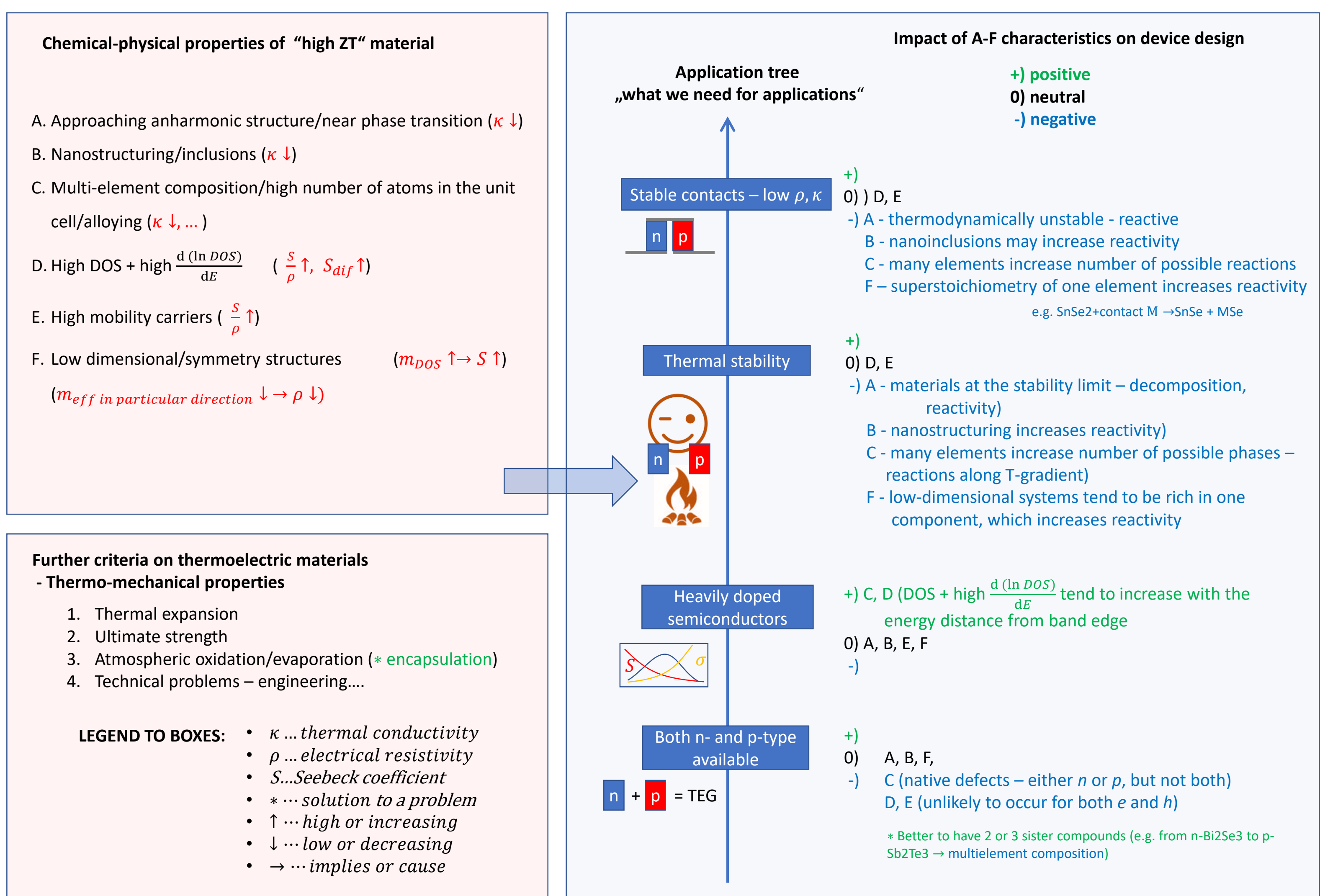


ROUNDTABLE TOPIC

21. 09. 2023, 13:30

Although a thermoelectric device consists of many structural units (heat exchangers, TE couples, electrical contacts/conductors...), the heart of a TE device is the TE couple/battery using thermoelectric materials. From your responses, it seems that the most painful issue and one of the long-term problems is the long journey from basic TE materials to their use in TE devices. Leaving aside the technical aspects, we will try to discuss the journey of TE materials from their discovery to the design of a TE generator/cooler.

There are new TE materials that clearly outperform older materials in their thermal and electrical properties. Paradoxically, they are not used. This 'paradox' involves many aspects. We hope that some insights and answers on this topic will be provided by a roundtable planned for the upcoming ECT 2023 conference in Prague. The diagram below, which contrasts the properties of a good TE material (left side) with the material requirements in terms of TE applications (right side), can serve as a guide. Both sides are certainly incomplete and can be extended with additional parameters. Please take it as a starting point for discussion. Although the diagram is somewhat unclear, I'm afraid it shows that good material properties for ZT materials are largely at odds with good material properties for device design/applications. Fortunately, however, solutions can certainly be found. That's what we like to do, isn't it? Moreover, I hope I have made many erroneous conclusions that will stimulate discussion.



- * Possible solutions:
1. Low to medium –T applications, in general
 2. Half-Heusler
 3. Si-Ge
 -?