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Towards a high-current triode thermoelectronic generator GERWIN HASSINK, PATRICK HERLINGER, WOLFGANG BRAUN, CYRIL STEPHANOS, JURGEN SMET, JOCHEN MANNHART, Max Planck Institute for Solid State Research, Stuttgart, Germany — Thermionic power generation obtains electrical power directly from a temperature gradient by thermionic emission from a hot electrode to a cold electrode. The space charge created by the emitted electrons, however, severely reduces the efficiency of such generators. Recently, a triode setup with supporting magnetic field has demonstrated to greatly reduce the space charge[1]. Based on these results, further development has been started to reach higher output by, e.g., reducing the electrode spacing to 100 μm, and by increasing the electrode area. In addition, new gate electrode materials and geometries are investigated. The importance of the work function not only for the emitter and collector, but also for the gate, is clear from both the theory and experiment. Work function engineering through surface modification is discussed.

[1]Meir et al., J.Renew.Sust.Energ. 5, 043127(2013)

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