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# The Influence of Thomson Effect on the Performance of N-Type Skutterudite Thermoelement

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**Abstract :** Due to the temperature-dependence and mutual coupling of thermoelectric parameters, the Thomson effect always exists, which is derived from temperature gradients during thermoelectric conversion. The synergistic effect between the Thomson effect and non-equilibrium heat transport of charge carriers leads to local heat absorption or release in thermoelements, thereby affecting its power generation performance and conversion efficiency. This study verified and analyzed the influence and mechanism of the Thomson effect on N-type skutterudite thermoelement through quasi-steady state testing under approximate vacuum conditions. The results indicate the temperature rise/fall of N-type thermoelement at any position is affected by Thomson heat release/absorption. Correspondingly, the Thomson effect also contributes advantageously/disadvantageously to the output power of N-type skutterudite thermoelement when the Thomson coefficients are positive/negative. In this work, the output power can be promoted or decreased maximally by more than 27% due to the presence of Thomson heat when the absolute value of the Thomson coefficient is around 36 μV/℃.

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