thickness (optically thin) while reducing the electrodes thickness (optically thick) explained the temperature difference (ΔTmax) variation between the different configurations.

Table 3. Radiative effect on the maximum temperature

thickness (μm) An/el/ca	Tmax (K) without radiative effect	with radiative effect	ΔT_{max} (K)
200/200/200	1183.98	1182.95	1.03
150/300/150	1189.93	1188.56	1.37
100/400/100	1195.74	1193.94	1.80

5. CONCLUSIONS

In this paper, a two-dimensional study of the radiative effect on the temperature distribution inside SOFC is performed by the lattice Boltzmann method. The model takes into account the ohmic losses in the different components of the SOFC. Different configurations are considered in this study and some conclusions were summarized as follows:

- A good agreement valid with previous numerical investigations demonstrates that lattice Boltzmann Method is an appropriate method for different applicable problems.
- The maximum temperature is located in the electrolyte; the ohmic losses in the electrolyte are the ones primarily responsible for the maximum temperature inside the SOFC.
- Reversing cathode and anode thickness, while maintaining the electrolyte thickness preserved, does not affect the maximum temperature without radiative effect. The opposite behavior occurs in the presence of the radiative effect
- The radiative effect increases with the electrolyte thickness augmentation.

While it may seem that the radiative effect is negligible within the SOFC due to the low thickness of the electrodes and electrolyte, this is not actually a reasonable assumption given the high operating temperature and the important ohmic losses in the electrolyte layer, which can promote the radiative effect.

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