is in the order of 3000 Pa. The effect of volume fraction and number of channels on cooling performance are also documented, i.e., peak temperature decreases as φ increases, and decreasing the number of channels from 10 to 6 when φ=0.05 decreases peak temperature.

Then, the effect of changing the design from the radial configuration to tree-shaped configuration is uncovered with fixed volume fraction. Tree-shaped configurations provide smaller flow resistances than the radial configurations. Therefore, peak temperature is minimum with tree-shaped configurations when the pressure drop is small (i.e., 10 Pa in Fig. 6). However, conductive thermal resistances is a lot bigger in tree-shaped configurations than in radial configurations. Therefore, as the pressure drop increases, radial configurations provide better cooling performance. All these results lead us to suggest a hybrid design of radial and tree-shaped configurations. This hybrid design is created by placing radial channels in between tree-shaped channel configuration. We found that this hybrid design provides the smallest peak temperature (or very close to the smallest peak temperature) for the entire pressure drop region. We have also found that constraints and assumptions change the best performing design. Therefore, the design should be selected based on the constraints and limitations. This result is in accord with the constructal theory, i.e., there is no optimal design but the best performing design for a given time (conditions and constraints).

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