The Metal Patch Effect on the Microwave Heating Uniformity

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Introdution：Microwave heating is known for its efficiency and instantaneity. However, the non-uniformity of the microwave heating has limited the development of its application in industry. In order to solve this problem, a metal patch sticking to the turntable was proposed.

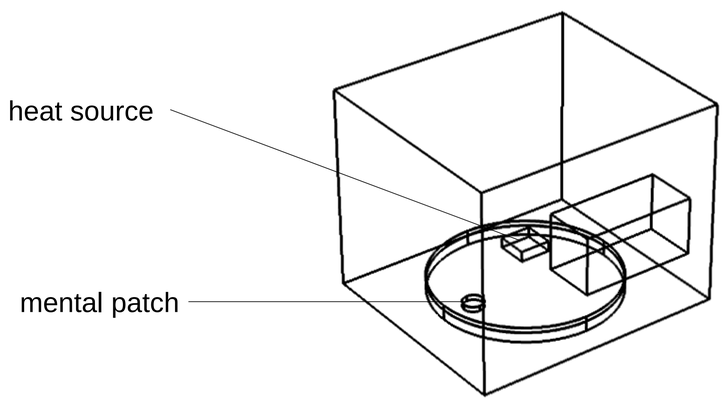

Fig 1. 3D Schematic of microwave heating device

Calculation Method: In the model, the electromagnetic field and heat transfer are coupled with each other. The flow chart is showed in Figure 2.

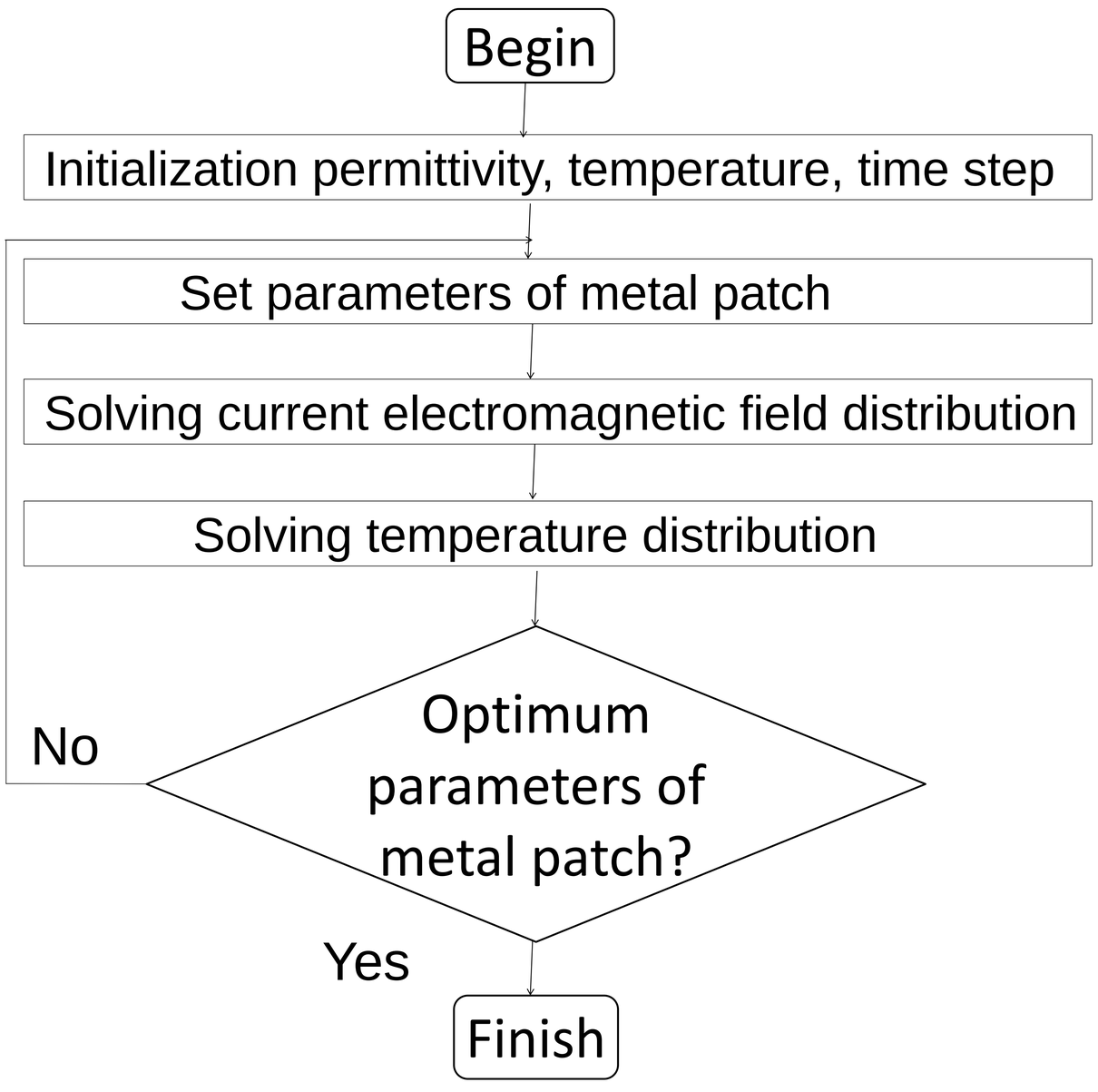

Fig 2. Calculation flow chart

Results： The calculation results of temperature distribution are shown as follows.

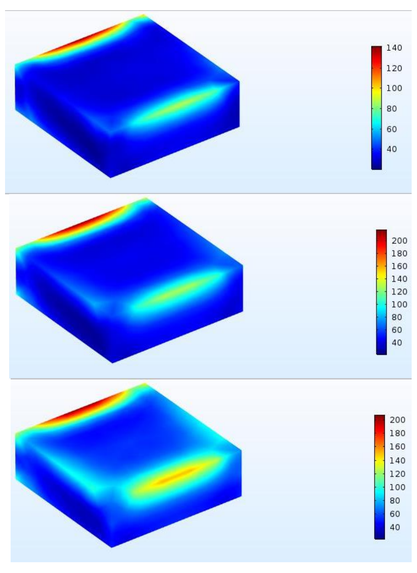

Fig 3. The temperature distribution in 1s, 3s, 5s without a metal patch

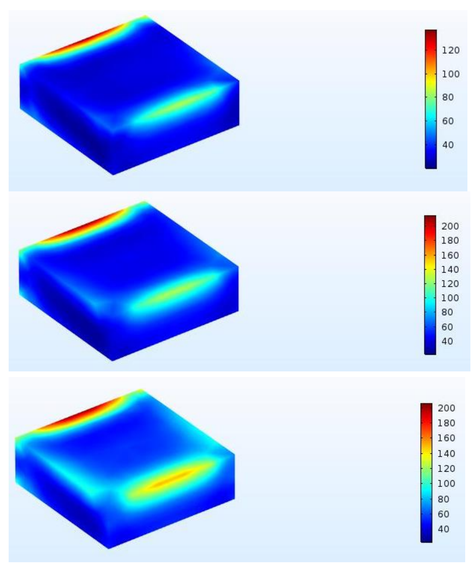

Fig 4. The temperature distribution in 1s, 3s, 5s with a metal patch which radius is 0.005m

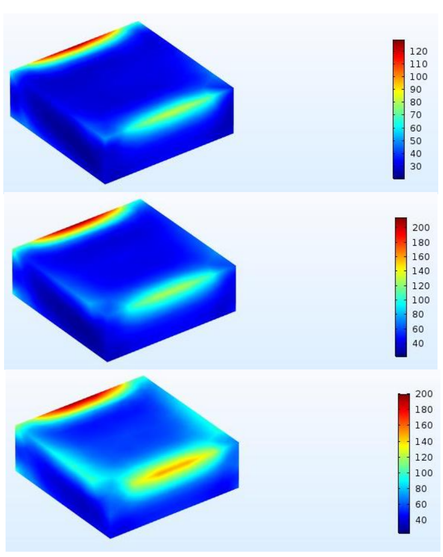

Fig 5. The temperature distribution in 1s, 3s, 5s with a metal patch which radius is 0.010m

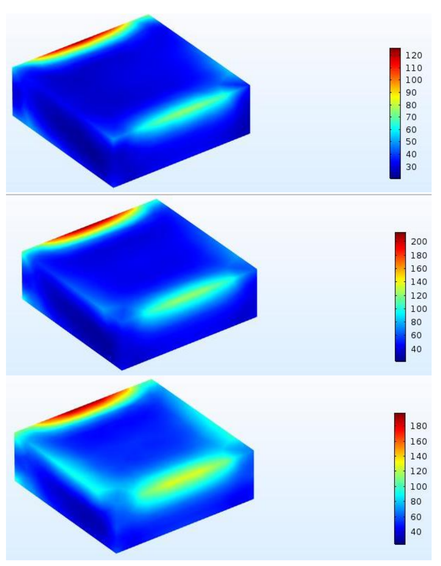

Fig 6. The temperature distribution in 1s, 3s, 5s with a metal patch which radius is 0.015m

Conclusions： The simulation results indicated the notable improvement of the heating uniformity owing to the metal patch. This would be helpful to improve the uniformity of the microwave heating in industrial application.