The Metal Patch Effect on the Microwave Heating Uniformity

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Abstract

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.
During the heating process, the location of the metal patch will change along with the rotation of turntable. Thus, regulate the electromagnetic field inside the microwave oven periodically. This will improve the uniformity of the microwave heating.
In order to simulate the heating process, a simulation built with the COMSOL Multiphysics® software based on the multiphysics has been studied. First, the material properties inside the microwave oven were assumed as time-dependent function. Then, the radius of the patch and the distance from the patch to the heated material were changed separately in order to optimize the size and relevant location of the patch. The distribution of the temperature was studied and the COV of the heated material was calculated.
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.