Designing Cups to Adjustable to the Changing Temperatures of Viscous Liquids

Kawano, Mana (School: Hiroshima University High School)
Nagata, Motoka (School: Hiroshima University High School)

When we were drinking corn soup, we felt that its temperatures go up and down abruptly. On the other hand, when we were drinking coffee or tea, we felt their temperatures monotonically go down. We aimed to clarify whether this phenomenon actually exists. Also, we aimed to certify the cause of this phenomenon if this phenomenon exists. The preliminary experiment was operated manually. In the experiment, we made a computer-controlled experimental device and use it. We also used digital thermometers, stickers that show different colors depending on the temperature, and thermography to observe temperature changes. We conducted an experiment to allow liquids of different viscosities to flow out of a cup. As a result, we found that this change of temperature is more likely when the liquid has a high viscosity. And we clarified that the liquid flows out in different manners depending on which point inside the cup the liquids is. Based on this finding, we improved the shape of a cup to prevent the fluctuation of temperature from happening. It was found that setting a cylinder-shaped object inside a cup can prevent the fluctuation of temperature most among the five models we invented. We expect that the cup we have improved may enable those who have difficulty swallowing to drink thickened liquid without the risk of getting scalded. The cup we have improved may also be useful in pouring out viscous liquids which need temperature control, such as liquid metal or chemical liquids.

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