

Electrothermal Applications of Graphene for Consumer Electronics

Byung Hee Hong

Department of Chemistry, Seoul National University, Seoul 08826, Korea

Graphene Square Inc. & SNU Graphene Research Center at Advanced Institute of Convergence Technology, Suwon 16229, Korea.

byunghee@snu.ac.kr

Recently, we developed transparent graphene heating modules to be applied to a new type of cookware, the "Graphene Kitchen Styler." The name came from the idea of replacing the old cooking styles based on 100-year-old coil-heater technology with novel transparent planar graphene heaters that generate IR radiation more efficiently from atom-thick, layers more robust than diamond. The same idea has been applied to a graphene-based heat radiator, simply called "G-radiator", which is a virtual fireplace that generates heat from graphene, more efficiently with less space and less energy.

The graphene heater is also important for automotive applications. The graphene heater film can be inserted between two layers of front windshield glass and uses minimum electrical energy to heat the windshields, which is more efficient than heating the whole interior of a vehicle by air conditioning for EVs. The same technology can be applied to the defrosting of RiDAR covers and digital side view mirrors as well as various industrial heating modules for semiconductor fabrication processes. These electrothermal applications of the graphene heater are branded "Thermo-Graphene."

References

- [1] Caitlin Petreyck "The Best Invention of 2022: Cooking With Nanomaterials", TIME, Nov. 10, 2022
 - [2] "Best of Innovation: Graphene Radiator by Graphene Square" CES 2023, Las Vegas, USA. (<https://www.ces.tech/innovation-awards/honorees/2023/best-of/g/graphene-radiator.aspx>)
 - [3] "30 Innovative Brands of the Year 2023: A high-tech startup on a pursuit to commercialize graphene to create VALUE-generating ecosystem: Graphene Square" The Silicon Review, Jan. 2023. (<https://thesiliconreview.com/magazine/profile/graphene-square-commercialize-graphene-value-generating-ecosystem/>)
-

Figures



Figure 1: A photograph of "Graphene Radiator".
