

Induction evaporation for the coating of plastic films

*Function test of inductive
evaporation with argon plasma*



View on a heated crucible

Plastic films fulfil many functions in everyday life. They are used as food packaging; they build the basis for flexible solar cells or decorative films for furniture design. However, each film requires adapted coatings for various applications.

There are various processes for vacuum coating of plastic films, each of which is suitable for a specific application. Particularly in the case of large-area coating, there are some disadvantages. Electron beam evaporation, for example, is a relatively cost-intensive process and therefore not suitable for every application.

In boat evaporation, mainly aluminum is evaporated, and sputtering processes are very time-consuming due to the lower coating rates.

Technology

As a result, the Fraunhofer FEP has been working on an innovative and extremely flexible process for high rate deposition of substrates.

This new approach to induction evaporation consists essentially of inductively heated individual evaporation sources. Evaporator arrays can be realized via a modular design. Thus, large coating widths can be achieved by overlaying the individual coating areas.

Furthermore, various crucibles can be equipped, which offers the additional advantage of evaporating a wide range of materials.

The technology can also be combined with plasma sources and reactive gas systems. This modular induction evaporation is fed by a power supply based on a novel inverter design for an adaptable and efficient energy coupling.

Contact

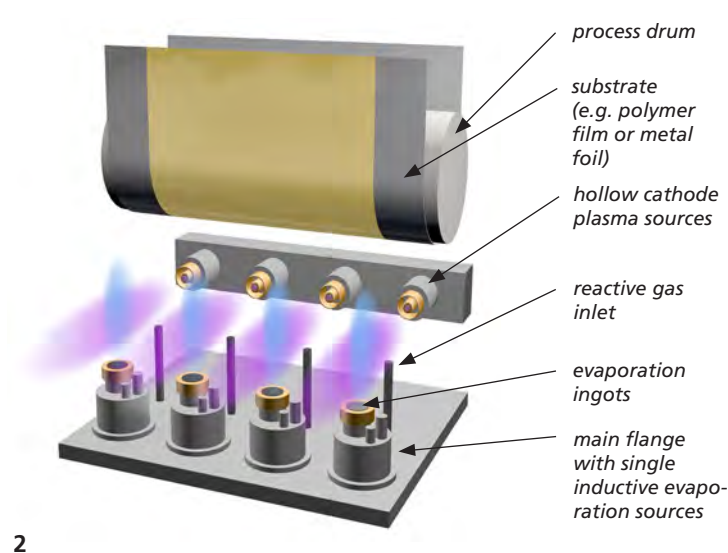
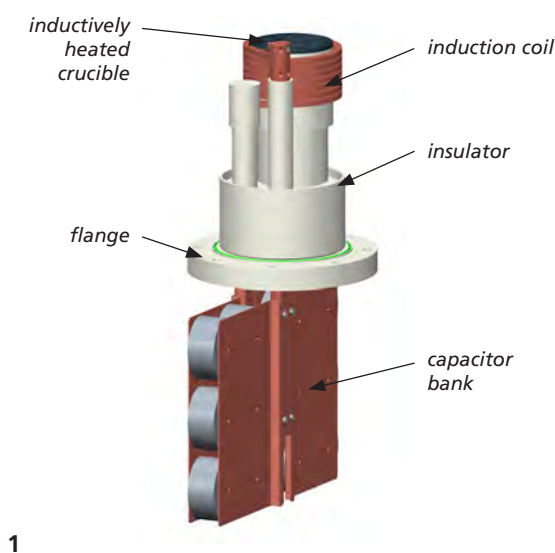
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This innovative power supply also provides interfaces for automated process control.

The high coating rates and the automated processes provide an efficient new process for large-area film coating.

Materials

- Aluminum
- Copper
- Silver
- Indium
- Silicon, silicon monoxide
- Lithium phosphorus oxinitrite (LiPON)

Applications

- Flexible electronics
- Flexible solar cells
- Forgery protection
- Decorative films
- Packaging films
- Batteries

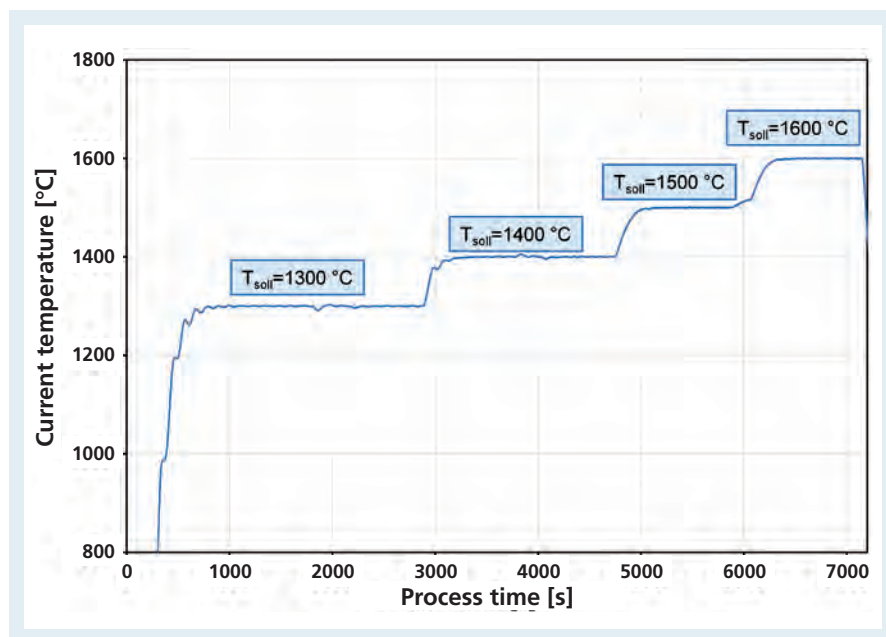
Advantages

- Flexibility through use of different materials
- Increase overall productivity through high coating rates and automated processes
- Possibility of combination with plasma-assisted methods
- Various film widths

Our offer

Providing surfaces with tailor-made functions is the goal of our research and development work. Our offer includes all necessary steps from the concept phase up to the technology transfer:

- Feasibility studies
- Development of coating systems and customer-specific coating technologies
- Adaptation of existing coating lines
- Scaling up for large substrate areas, in-line systems and roll-to-roll systems
- Pilot production in the pilot phase of a product
- Technology transfer



Precision temperature control: deviation of actual temperature from setpoint over the entire temperature range $< \pm 5^\circ\text{C}$

- 1 3D representation of an inductive single evaporation source
- 2 Example for the superposition of single inductive evaporation sources for the coating of large web widths