



- 1 *Highly conductive composite filaments for 3D printing.*
- 2 *3D-printed impeller wheel made of ABS with aerosol jet structures.*
- 3 *3D-printed USB-stick with printed circuit and integrated SMD. Project "Hyb-Man".*

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PRINTED 3D-ELECTRONICS

The widespread process of "3D printing" (also referred to as Fused Deposition Modeling or FDM) offers geometric freedom in design and the production of individualized components made of thermoplastics. By using new, specially adapted composites, additional functions such as sensors or thermal and electrical conductivity can be integrated into the components.

Technical implementation

Printing a technical e. g. ABS and an electrically conductive plastic in parallel, for example, opens up new levels of freedom in design. Components such as circuit paths can be printed on the interior of a component. Strain or temperature sensors can also be printed onto the surface of an FDM component using dispensing or aerosol jet printing. The temperature-sensitive FDM material requires the use of special curing processes for hardening the printed sensors. Laser or photonic sintering are possible options here.

Potential applications

The combination of different methods results in a number of application examples:

- Sensor systems located in or on additively manufactured plastic components
- Replacement of wires with direct circuit paths in the interior of the component
- Integration of circuit boards and other electronic components with printed contacts
- Thermal management for components made of materials with varying levels of thermal conductivity