



2023 Nanocrystalline Soft Magnetic Materials Workshop: Advanced technologies for efficient power electronic systems

Zafer TURGUT

Air Force Research Laboratory
Aerospace Systems Directorate

1950 5th Street, Wright-Patterson AFB, OH 45433
(937) 255-2914 (Office)
zafer.turgut.2@ us.af.mil

- B. S., Metallurgical Eng. & Materials Sci., **Istanbul Technical University, Turkey** 1989
- M. S., Materials Science and Eng., **Carnegie Mellon University, Pittsburgh, PA** 1997
- Ph.D., Materials Science and Eng., **Carnegie Mellon University, Pittsburgh, PA** 2000
- Co-founder of AFRL Magnetics Lab (2000)



AFRL Magnetics Lab

In-house R&D

- Materials R&D; magnetocaloric, soft and permanent magnets
- Component level R&D: converters, PM motors for hybrid propulsion, actuation (missile guidance, flight control), electronic warfare

Program Management

- AFWERKS, AFOSR, SBIR, STTR, DPA Title III, DoD ManTech



Emerging DoD Applications

- Pulse compression
- Low frequency antennas
- Amorphous/piezoelectric composites for PM magnetostatic wave filters



Are amorphous/nanocrystalline magnets utilized to their full potential?

Adaptation of nanocrystalline materials for legacy applications:

- Electromachine laminations
 - Stamping challenges- thicker laminations, compositions with wider glass transition temperatures
- Electrical grid
 - Lack of data on expected transformer lifespan