

International Exhibition of Innovation IEI 2023

Today, Ni-Co-based alloys are most often found in the form of electrolytically deposited coatings. The manufacture and using of conventional coatings poses environmental risks. Hence the need to replace coating methods with technologies more environmentally acceptable in accordance with the European Parliament's WEEE (Waste Electrical and Electronic Equipment) Resolution.

Currently, there is a development of research into the possibility of developing and implementing alternative technological processes and new materials.

Two methods have been used as completely new technologies: High Pressure Die Casting Method and Melt Spinning.

The selected Ni-Co-based alloys are characterized by very good corrosion resistance, including in aggressive environments, high wear resistance, very good strength, and present interesting magnetic properties.

Thanks to these properties, they have a very broad spectrum of applications.

Production of selected Ni-Co-based alloys by melt spinning and high-pressure die casting for electronics

Wirginia Pilarczyk, Weronika Izydorczyk, Rafał Babilas, Michał Bigaj, Inez Kredowska, Paweł Bartecki, Tomasz Błasiak, Artur Germanek, Krzysztof Franek, Grzegorz Bortnik

Silesian University of Technology
Faculty of Mechanical Engineering
Department of Engineering Materials and Biomaterials
Akademicka 2A Street, 44-100 Gliwice
contact: wirginia.pilarczyk@polsl.pl

Materials science is related to the study of the composition, structure, characteristics, properties, performance and application of various engineering materials.

On the basis of properties and applications, electrotechnical materials can be divided into the following categories:

1. Conductors – solid conductor
 - Metallic conductor: gold, silver, copper, aluminum, etc.
 - Non-metallic conductor: graphite
 - Alloy conductor: brass, bronze, etc.
 - Electrical conductors can be classified based on their ohmic response:

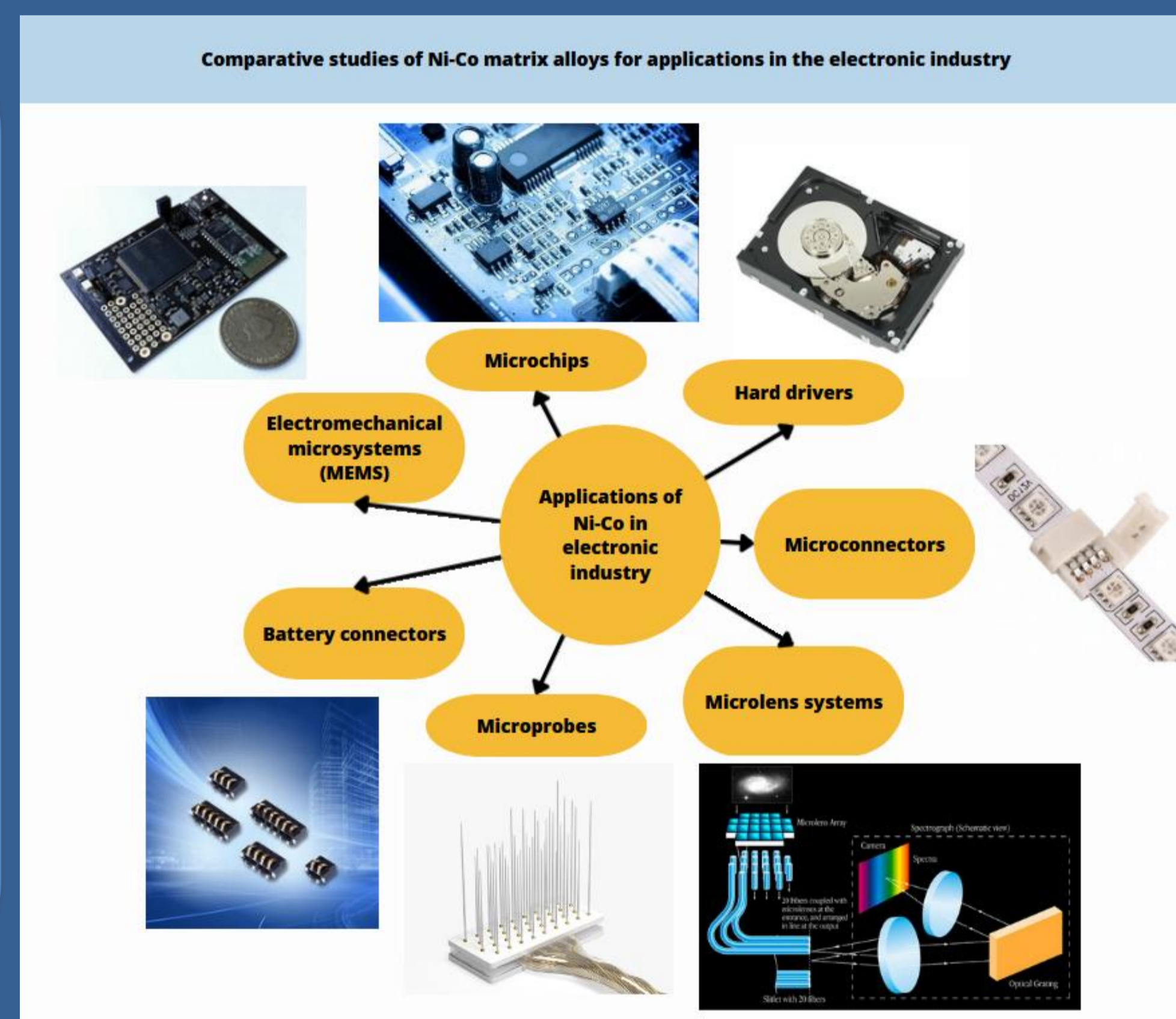
Ohmic conductors – i.e. gold, copper, silver, aluminum etc. This type of conductors always follow Ohm's law ($V \propto I$)

- Non-ohmic conductors – LDR (Light dependent resistor), diode, filament of bulb, thermistors, etc. V vs. I graph does not give a straight line.

2. Semiconductors – i.e. germanium, silicon, GaAs etc.

3. Insulators – plastics, rubbers, mica, insulating papers etc.

4. Magnetic materials – iron, silicon steel, Alnico, ferrites etc.



Production by melt spinning and high-pressure die casting method

