



Magnetic Liberty

Fatemeh Mollaie . March 2025

What would you do with a
Magnetic Textile ?



A GIF of a textile

A futuristic fashion

- Textiles have remained passive for centuries – they insulate, protect, and decorate, but they **do not interact** with their environment.
- Traditional magnets are **rigid, heavy, and not fabric-friendly**.
- Industries (fashion, healthcare, robotics) need **smart, functional textiles** that do more.

Inspiration – The Vision Behind the Project

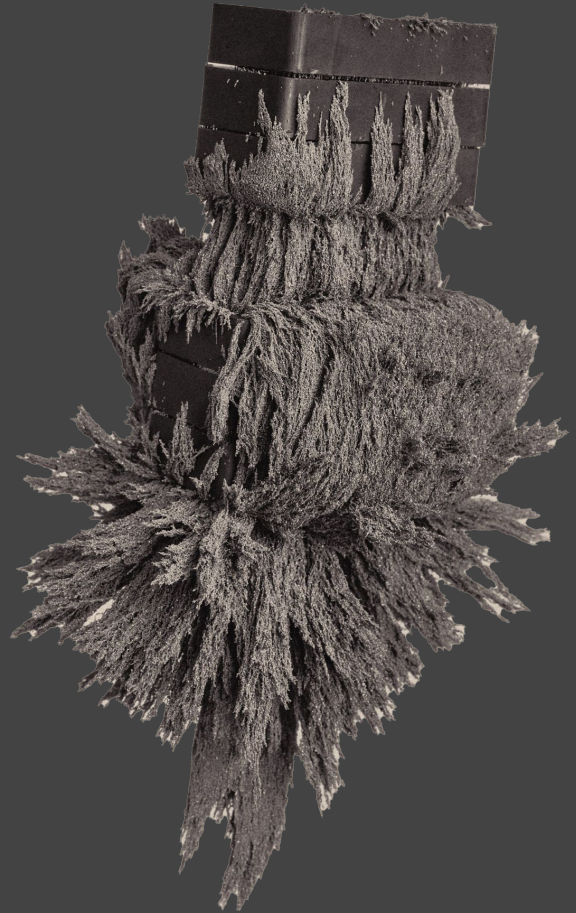
- **Fashion-Tech Fusion** → Inspired by **Hussein Chalayan & Neri Oxman**.
- **Smart Materials** → Magnetic textiles that interact dynamically.
- **Sustainability** → Closing the materials loop.



My Solution:

- ① Metal Nitrates (**Fe, Ni, Co**)
- ② Chemical Reaction (**Hydrazine, Hexamine**)
- ③ Fabric Coating
- ④ Heating & Magnetization

In situ Synthesis Nickel Ferrite nanocomposite on fabric for magnetic properties





The Making – Experiments & Challenges

What Worked & What Didn't:

- ✓ Achieved **soft magnetic fabric** (sticks to magnets).
- ✗ Fabric **didn't initially stick to iron** → Adjusted heating & materials.
- ✓ Found a **way to recycle waste from the process** → (Tease upcoming slides).

5 μm

Key Audiences:

Wearable Tech & Smart Fashion Designers → They need textiles that interact with the body & environment.

Healthcare & Rehabilitation → Magnetic textiles could aid in muscle stimulation, therapy, or attachable medical patches.

Industrial & Workwear Companies → Workers could have tool-holding aprons, easy-attach accessories, and new utility clothing.


Textile & Material Engineers → Innovators looking for new materials with hybrid functionalities.








This project is not just about making fabric
magnetic **it's about**
changing how we
think about textiles
in the future.

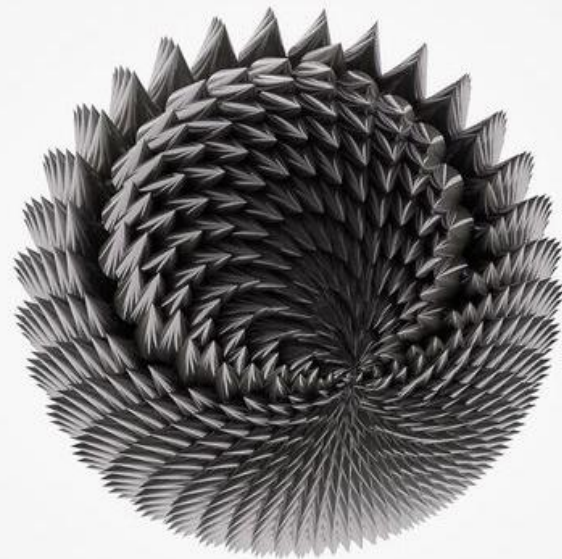
Real-World Applications

 **In Fashion:** Jackets that hold detachable accessories, dynamic styling without buttons/zippers.

 **In Healthcare:** Wearable patches for therapy, self-attaching bandages.

 **In Industrial Use:** Magnetic gloves for assembly-line work, uniforms that hold tools.

 **In Soft Robotics:** Fabrics that can respond to magnetic fields, enabling movement.



The Breakthrough— **Closing the Loop**

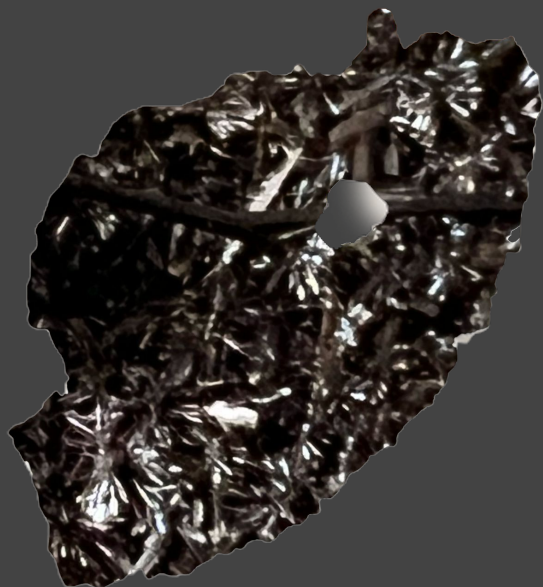
- Instead of discarding wastewater, I **crystallized metal salts** from it.
- This created **new materials: magnetic powder & reusable crystallized salts.**

The Sustainable Innovation

Green Magnetic Textiles

- ✓ **Reduces Environmental Impact** → No toxic metal waste.
- ✓ **Recycled Materials** → Magnetic powder can be reused for new textiles.
- ✓ **New Sustainable Smart Textile Production Model.**





Magnetic Crystal

A Sustainable By-Product

From Waste to Value: The crystallized magnetic powder is extracted from the wastewater, making the process greener.

New Purpose: Instead of discarding the by-product, it is transformed into unique fashion accessories.

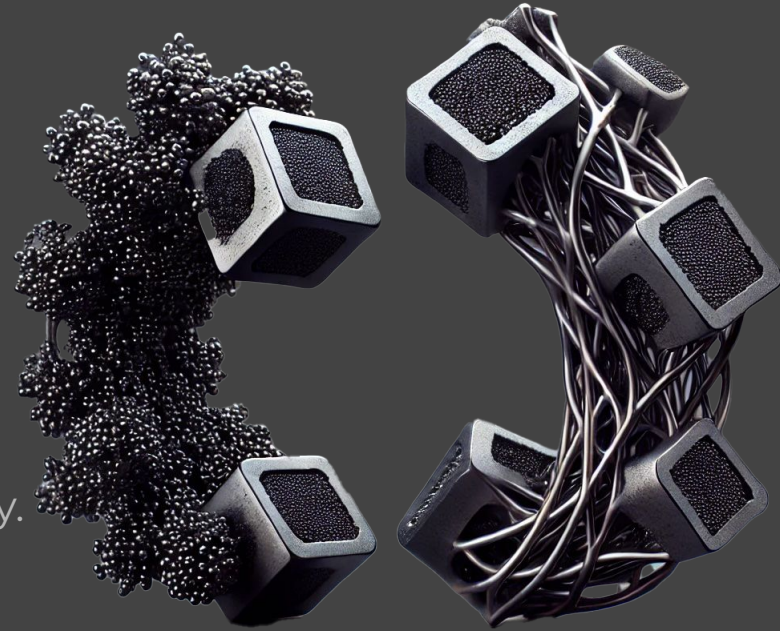
Future Potential

Magnetic Crystal Accessories

Design Possibilities: Earrings, necklaces, and brooches with an avant-garde, asymmetrical aesthetic.

Material Features: Textured, metallic, and interactive, with potential magnetic adaptability.

Eco-Friendly Vision: A step toward circular fashion by integrating waste-derived materials into design.



A futuristic fashion show runway with a mannequin in a long, flowing, pleated dress. The runway is illuminated by bright, linear lights on the ceiling, creating a dramatic, high-tech atmosphere. Several other mannequins in long, flowing dresses are positioned along the sides of the runway, creating a sense of depth and scale. The overall aesthetic is sleek and modern, emphasizing the future of materials in fashion.

The Future of Materials

- Magnetic textiles **merge technology with sustainability.**
- We can **rethink how materials are made, used, and recycled.**

What if the future of fashion is not just what we wear,
but how it interacts with us?



Thank You!