Dr. Muhammad Aneeq Haq

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About

Dr. Haq's research and consultancy interests lie at the intersection of powder metallurgy, alloy design, and sustainable manufacturing, with a strong focus on developing multifunctional materials and advancing industrial standardization. With expertise spanning **advanced alloys, rare-earth materials, and coating technologies**, He bridges fundamental research and industrial application, aiming to design materials that extend component life, improve performance, and meet international ISO compliance standards.

Areas of Expertise / Specialization

- Powder Metallurgy and Sintering, Alloy Design (High-Performance Steels, High-Entropy Alloys), Rare Earth Materials (NdFeB Magnet Manufacturing and Recycling), ISO Standardization, Development, and Compliance

Consultancy & Research Capabilities

- **Laboratory Facilities:** X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM), X-ray Fluorescence (XRF), Alloy Fabrication (Atomizer, Ball Milling, Spark Plasma Sintering), and Industrial Coating Systems.
- **Software Expertise:** CALPHAD-based computational thermodynamics tools.
- **Specialized Fields:** Advanced Materials design, High Entropy Alloys, Surface engineering, and Recycling of strategic materials.

Potential Areas for Future Consultancy

- Development of industrial coatings to reduce maintenance cycles and equipment downtime.
- Design and optimization of **multifunctional alloys** including **high-entropy, titanium-based, and advanced steels**.
- ISO compliance consulting for **manufacturing and sustainability standards**, including ISO 22000, 22450, 14000, 50000, and 630 series.

Selected Publications

1. Haq, M.A. *et al.* "Designing co-reinforced in-situ (Cr_3C_2(w)+Cr_2O_3(p))/CoCrFeNi composite with excellent strengthening efficiency," *Materials Science and Engineering: A* 832, 142365 (2022).
2. Haq, M.A. *et al.* "Insights into the development of Fe-modified Ti-Nb alloy: A powder metallurgy perspective," *Materials Today Communications* 38, 107743 (2024).
3. Haq, M.A. *et al.* "$Nd_2Fe_{14}B$/FeCo Core–Shell Nanoparticle Synthesis Using Galvanic Substitution Based Electroless Plating," *Coatings* 12(3), 389 (2022).
4. **Patent:** Eom, N.S.A., Kim, B.S., Haq, M.A. *et al.*, *Core-Shell CoCrFeNiTi-Based High Entropy Alloy and Method for Manufacturing the Same*, **KR102302891B1**.
5. **ISO Standard:** *ISO 22928-1:2024 — Rare Earth — Analysis by Wavelength Dispersive X-Ray Fluorescence Spectrometry (WD-XRFS)*.
6. Russian Mineral Market Flow and Economic Direction for Securing Stable Resources," *Journal of Powder Materials* 26(4), 345–349 (2023).

Collaboration & Networking

Existing Industry / Institutional Linkages

- **International Partnerships:** Korea Institute of Industrial Technology (KITECH), Korea National Institute of Rare Metals (KORAM), National Institute of Standards and Technology (NIST- USA), Intertek-Australia, SGS-Canada
- **National Partnerships:** Surface Engineering and Technology Limited, Global Star Marbles, Institute of Materials, Minerals and Mining-AUST
- **Preferred Engagements:** Joint R&D, Prototyping, Industrial Consultancy, and Technology Transfer.