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Seminar Title	: Fabrication of Mo based alloys by powder metallurgy for structural application
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Venue	: M.Tech class room (PG Building)
Date and Time	: 19 Jun 2024 (10:30 am)
Abstract	: In this study, six distinct alloy compositions were synthesized via mechanical alloying: S1 (Mo <sub>80</sub> Ni <sub>10</sub> Si <sub>10</sub> ), S2 (Mo <sub>80</sub> Ni <sub>10</sub> Co <sub>10</sub> ), S3 (Mo <sub>80</sub> Ni <sub>10</sub> Si <sub>5</sub> Co <sub>5</sub> ), S4 (Mo <sub>79</sub> Ni <sub>10</sub> Si <sub>10</sub> (Y <sub>2</sub> O <sub>3</sub> ) <sub>1</sub> ), S5 (Mo <sub>79</sub> Ni <sub>10</sub> Co <sub>10</sub> (Y <sub>2</sub> O <sub>3</sub> ) <sub>1</sub> ), and S6 (Mo <sub>79</sub> Ni <sub>10</sub> Si <sub>5</sub> Co <sub>5</sub> (Y <sub>2</sub> O <sub>3</sub> ) <sub>1</sub> ) (in weight%). These powders were consolidated at 1500 °C for 1.5 h in hydrogen atmosphere. After 20 h of milling, oxide particles were encapsulated within Mo particles. Alloys containing Y <sub>2</sub> O <sub>3</sub> exhibited the smallest particle sizes and a bimodal particle size distribution. XRD analysis of sintered samples identifies the presence of hard and brittle intermetallic phases, including Mo <sub>3</sub> Si (cubic), Ni <sub>3</sub> Si (cubic), and MoNi (orthorhombic). SEM analysis reveals that Y <sub>2</sub> O <sub>3</sub> nanoparticles reduce the average grain size of the Mo matrix. Elemental mapping confirms the presence of Y <sub>2</sub> O <sub>3</sub> within the Mo matrix in alloys S4 to S6. Sintered alloy S6 achieves the highest relative density of 89.74%. Alloys S2 and S3 exhibit the highest hardness values of 9.08 GPa and 8.85 GPa, respectively, attributed to their significant intermetallic phase formation. Incorporating Y <sub>2</sub> O <sub>3</sub> particles improves the wear resistance of the Mo alloys due to oxide dispersion strengthening.