

Keywords – purpose and general recommendations

In M-ERA.NET, keywords are used in the context of the centralized evaluation of proposals to allow for a first screening of the scope of the proposals and the preliminary selection of potential evaluators. Keywords are not an evaluation criterion but they are crucial for the identification of the best suited evaluators for a given proposal.

The ensemble of chosen keywords must convey enough information to pre-select a group of potentially suitable evaluators within a vast pool of experts (consider describing different aspects of the project such as: main scientific area / domain, system / property / material of interest, applications / objectives and pertinent procedures / techniques). Selecting keywords that are too general, too specific or that don't allow for a general overview of the scope of the project hinders the workflow of the centralized evaluation.

Please verify the following lists before adding “additional keywords” to describe your project. Adding a new keyword to describe a similar/related concept may result in false negatives in the evaluator pre-selection process.

Please avoid choosing redundant keywords.

Please avoid using acronyms as a keyword, as they may have different meanings across different fields.

Practical examples:

- *A project submitted to Topic 4 – Functional Materials should not have “Functional Materials” among its keywords: no relevant information added.*
- *“3D printing” is a predefined keyword. Additional keywords should not contain “3D printed”, “3D printed structures”, “3D printing technology” or “3D-printing”.*
- *“Lithium Batteries” is a predefined keyword. Additional keywords should not contain “Li Batteries”.*
- *A cluster of keywords such as “advanced composite materials; advanced multifunctional materials; characterization” does not provide enough information about the scope of the project.*

Predefined keywords - mandatory

- **Level 1 – Topic specific KWs**
These are the keywords present in the Call Documents, defined by the strategic expert group, and should be used to define the positioning of your project within the chosen Topic. These are broad keywords, please choose the ones that relate to your project even if they are not an exact match.
- **Level 2 – General KWs**
List of keywords common to all Topics. Some of these keywords might be broad, please choose the ones that relate to your project even if they are not an exact match.

Additional keywords - optional

After picking a total of at least 5 (and no more than 20) keywords from the previous lists, if necessary you may inform additional specific keywords to describe your individual project. These keywords must not be similar to the predefined keywords. These keywords can contain more detailed/specific information about the project.

Keyword lists

To facilitate the choice of keywords, you will find below the complete lists of predefined keywords proposed in the submission tool.

1 - Topic Specific Keywords:

Topic 1 - Sustainable Advanced Materials for Energy

- Advanced catalysts
- Artificial intelligence
- Battery materials
- Electrolysers
- Energy efficiency
- Energy harvesting
- Energy storage
- Fuel cells
- Hydrogen
- Hydrogen distribution
- Life cycle assessment
- Lightweight
- Liquid state batteries
- Materials safety
- Modelling
- Photovoltaic materials
- Piezoelectric materials
- Power to x
- Solar cells
- Solid state batteries
- Thermochemical materials
- Thermoelectric materials
- Triboelectric materials
- Wind turbines

Topic 2 - Innovative Surfaces, Coatings and Interfaces

- Advanced coatings
- Antipathogen coatings
- Bio-interfaces
- Functionalisation
- Innovative surfaces
- Interfaces
- Interphases
- Modelling
- Multifunctional coatings
- Nano-engineered coatings
- Sensing surfaces
- Structured surfaces
- Surface characterisation techniques
- Surface technologies
- Textured surfaces
- Thin films

Topic 3 - High Performance Composites

- Acoustic
- Additive manufacturing
- Alloy
- Automation
- Bio-based material
- Biocompatible
- Biological
- Casting
- Ceramic matrix composite
- Combustion
- Compostable
- Concrete
- Dielectric
- Durability
- Elastomer
- Fiber
- Filler
- Fire safety
- Gel
- Geopolymer
- Insulation
- Joining
- Laser processing
- Lightweight
- Liquid / resin molding
- Magnetic
- Mechanical
- Metal matrix composite
- Meta-material
- Mineral
- Nanomaterial
- Natural material
- Optical
- Piezo
- Plasma processing
- Polymer matrix composite
- Porosity
- Porous
- Powder metallurgy
- Recyclable
- Self-healing
- Sensing
- Sintering
- Solution processing
- Solvent-free processing
- Textile
- Thermal
- Thermoplastic
- Thermoplastic processing
- Thermoset
- Thin layer processing

Topic 4 - Functional Materials

- 2D materials
- Additive manufacturing
- Bio-based materials
- Catalysis
- Construction
- Eco-design
- Electro/photochromic materials
- Energy-efficient processes
- Healthcare
- Heterostructures
- Magnetic properties
- Membranes
- Metal-organic frameworks
- Metamaterials
- Nanomaterials
- Optical properties
- Photonic properties
- Piezoelectricity
- Plasmonics
- Polymers
- Porous materials
- Processing technologies
- Quantum technologies
- Recyclability
- Self-healing materials
- Sensors
- SSbD - safe and sustainable by design
- Thermal properties
- Thermoelectric properties
- Topological structures
- Triboelectric properties
- Tribological properties
- Upcycling
- Wearables

Topic 5 - Materials Addressing Environmental Challenges

- Air treatment
- Bio-based materials
- Biodegradation
- CO₂ valorisation
- Degradable materials
- Durability
- Green chemistry
- Hazardous substances
- Life-cycle assessment
- Recyclable materials
- Remediation
- Soil treatment
- Sustainable processing
- Waste recycling
- Waste reduction
- Water treatment

Topic 6 - Next Generation Materials for Advanced Electronics

- Advanced coatings
- Flexible electronics
- Heterogeneous integration
- High-power-control electronics
- Manufacturing methods
- Responsible electronics
- Sensors
- Sustainable semiconductor processing
- Thermal management
- Ultralow-power electronics
- Unconventional electronics

2 - General KWs

- 2D materials
- 2D polymers
- 3D cell growth
- 3D components
- 3D materials
- 3D model
- 3D printing
- Ab initio simulations
- Acoustic
- Actuators
- Additive manufacturing
- Adsorption
- Advanced battery design
- Advanced catalysts
- Advanced coatings
- Advanced simulation
- Aerogels
- Aerospace devices
- Air treatment
- Alloy
- Aluminium
- Amorphous materials
- Animal models
- Anisotropy
- Anti/de-icing
- Antibacterial properties
- Antipathogen coatings
- Arc plasma
- Artificial intelligence
- Atomic layer deposition
- Atomic layer etching
- Atomization
- Automation
- Automotive
- Aviation materials
- Band gap
- Batteries
- Battery materials
- Battery production
- Bio based coatings
- Bio based composites
- Bio imaging
- Bio-based materials
- Biocompatible
- Biodegradable fibers
- Biodegradation
- Biofilms
- Bioink
- Bio-interfaces
- Biological
- Biological properties
- Biological waste
- Biomass
- Biomedical application
- Biomimetics
- Bioplastics
- Biotechnology
- Bone implant
- Building engineering
- Cancer therapy
- Carbon based materials
- Carbon coating
- Carbon footprint
- Carbon nanotubes
- Casting
- Catalysis
- Catalysts
- Cathode materials
- Cellular materials
- Ceramic Matrix Composite
- Characterization
- Charge storage
- Chemical engineering
- Chemical vapour deposition
- Chiral nanostructures
- Circular economy
- Civil engineering
- Clays
- Clinical trials
- CO₂ capture and reduction
- CO₂ conversion
- CO₂ footprint
- CO₂ valorisation
- Coating process
- Combustion
- Composite multilayers
- Compostable
- Computational approaches
- Computational engineering
- Computational materials design
- Computational physics
- Concrete
- Construction
- Corrosion resistance
- Critical raw materials
- Crystal growth
- Data-driven machine learning
- Deep learning
- Degradable materials
- Deposition process
- Deposition techniques
- Desired properties
- Dielectric
- Digitalization
- DNA aptamers
- Dopants
- Drug delivery systems
- Durability
- Eco-design
- Elastomer
- Electric cars
- Electric field
- Electrical properties
- Electrical signals
- Electro/photochromic materials
- Electrocatalysis
- Electrochemical energy conversion
- Electrochemical energy storage
- Electrochemical oxidation
- Electrochemistry
- Electrode lifetime
- Electrode surface
- Electrodeposition
- Electrolysers
- Electromagnetic shielding
- Electron microscopy
- Electrospinning
- Electrospray deposition
- Emerging pollutants
- EMI shielding
- Energy efficiency
- Energy gap
- Energy harvesting
- Energy storage
- Energy transition
- Energy-efficient processes
- Environmental applications
- Environmental impact
- Epitaxial heterojunction
- Eutrophication
- Failure analysis
- Fast-charging capability
- Fatigue resistance
- Ferroelectrics
- Fiber
- Fibre reinforced polymeric materials
- Field-effect transistors
- Filament fabrication
- Filler

- Filtration membranes
- Fire Safety
- Flame retardants
- Flexible devices
- Flexible electronics
- Flexoelectric materials
- Flow reactor
- Foam
- Foamed glass
- Food industry
- Food packaging
- Food safety
- Frequency range
- Fuel cells
- Functional coatings
- Functional gradient
- Functional materials
- Functional nanostructures
- Functional textiles
- Functionalisation
- Functionalised products
- Fused filament fabrication
- Gallium nitride
- Gas emissions
- Gas permeability
- Gas sensors
- Gel
- Geopolymer
- Glass
- Grain boundaries
- Graphene
- Graphene oxide
- Graphite electrodes
- Green chemistry
- Green concrete
- Green electronics
- Green energy
- Green functional materials
- Green hydrogen
- Greenhouse gas capture
- Greenhouse gas conversion
- Greenhouse gas emission reduction
- Halide perovskites
- Haptic actuators
- Hazardous substances
- Healing
- Healthcare
- Heat recovery
- Heat storage
- Heat transfer
- Heating/cooling devices
- Hemocompatibility
- Heterogeneous integration
- Heterostructures
- High chemical stability
- High entropy alloy
- High temperature
- High-power-control electronics
- High-Pressure
- High-throughput
- Human motion detection
- Human robot collaboration
- Hybrid cathode
- Hybrid nanocomposites
- Hybrid processes
- Hybrid structures
- Hydrogel
- Hydrogen
- Hydrogen distribution
- Hydrogen evolution reaction
- Hydrogen generation
- Hydrogen storage
- Impact resistance
- Impedance spectroscopy
- Implants
- Imprinted polymer
- In situ characterization
- Inactive materials
- Industrial applications
- Inkjet printing
- Innovation chain
- Innovative batteries
- Innovative coatings
- Innovative components
- Innovative interfaces
- Innovative surfaces
- In-situ/Operando analysis
- Insulation
- Interfaces
- Internet of Things
- Interphases
- In-vitro testing
- Ion diffusion
- Ion implantation
- Ionic conductivity
- Ionic conductor
- Ionic liquids
- Ionomer
- Joining
- Langmuir-Blodgett films
- Laser beam shaping
- Laser cladding
- Laser powder bed fusion
- Laser processing
- Layered material
- Lead-free ceramics
- Life cycle assessment
- Light absorption
- Light emitting materials
- Lightweight
- Lignin
- Liquid / Resin Molding
- Liquid phase epitaxy
- Liquid state batteries
- Lithium anode
- Lithium battery
- Lithium metal
- Long-term resilience
- Low friction materials
- Low power device
- Low-dimensional materials
- Machine learning
- Magnetic
- Magnetic properties
- Magnetron sputtering
- Manufacturing methods
- Manufacturing technologies
- Market analysis
- Material chemistry
- Material design
- Material performance
- Material recycling
- Materials development
- Materials for energy
- Materials processing
- Materials safety
- Matrix composites
- Mechanical
- Mechanoluminescence
- Medical device
- Medical imaging
- Membrane electrode
- Membranes
- Metal air batteries
- Metal anodes
- Metal foams
- Metal forming
- Metal hydrides
- Metal Matrix Composite
- Metal nanoparticles
- Metal oxides
- Metal-doped graphene
- Metal-organic frameworks
- Metamaterials
- Micro thermal management
- Microelectronics
- Microfluidics

- Micromechanics
- Microstructures
- Mineral
- Modelling
- Molecular design
- Molecular modeling
- Molten salt
- Multifunctional coatings
- Multifunctional materials
- Multi-scale analysis
- Multiscale modeling
- Multivalent batteries
- Mxenes
- Nano composite Fiber
- Nanocarbon
- Nanocomposite coatings
- Nano-engineered coatings
- Nanoengineering
- Nanomaterial
- Nanomaterials
- Nanoparticles
- Nanotechnology
- Nanotribology
- Nanowires
- Natural Material
- Neuromorphic Computing
- Neutron detector
- Next generation batteries
- Next generation cathode
- Nitrides
- Non-invasive sensors
- Operando analysis
- Optical
- Optical properties
- Optoelectronics
- Organic chemistry
- Organic light-emitting diode
- Organic semiconductor
- Organic solar cells
- Organ-on-chip
- Oxides
- Oxygen evolution reaction
- Oxygen reduction reaction
- Perovskite
- Persistent luminescence
- Perylenediimide
- PET
- PFAS removal
- Phase change materials
- Phosphors
- Photodiode
- Photon upconversion
- Photonic devices
- Photonic properties
- Photovoltaic materials
- Physical properties
- Piezo
- Piezoceramics
- Piezoelectric materials
- Piezoelectricity
- Plasma processing
- Plasma-enhanced chemical vapour deposition
- Plasmonics
- Plastic wax
- Pollution
- Polymer electrolytes
- Polymer Matrix Composite
- Polymers
- Porosity
- Porous
- Porous materials
- Post-consumer polyolefins
- Post-processing
- Powder metallurgy
- Powder regeneration
- Power to X
- Pressure/strain sensing
- Pressureless SPS
- Printed electronics
- Printing
- Processing technologies
- Processing-structure-property relationships
- Product development
- Product life cycle
- Proton Exchange Membrane
- Proton exchange membrane fuel cell
- Prototyping
- Pulsed laser deposition
- Quantum technologies
- Radiation detector
- Reactive extrusion
- Reconfigurable surfaces
- Recyclability
- Recyclable
- Recyclable materials
- Regenerative medicine
- Reinforcing particles
- Reliability
- Remediation
- Renewable energy
- Renewable materials
- Renewable resources
- Responsible electronics
- Reuseable materials
- Robotics
- Scalability
- Scanning probe microscopy
- Scintillating screens
- Scintillators
- Screen printing
- Selective Laser Sintering
- Self-assembly
- Self-healing
- Self-healing materials
- Selfsustaining system
- Semiconductors
- Sensing
- Sensing surfaces
- Sensors
- Silicon
- Silicon Carbide
- Single crystals
- Single photon
- Sintering
- Smart materials
- Smart packaging
- Smart products
- Smart textiles
- Smart windows
- Sodium ion batteries
- Soft actuators
- Soft robotics
- Soil treatment
- Solar cells
- Solid oxide electrolysis
- Solid state batteries
- Solid state materials
- Solid-state dewetting
- Solution Processing
- Solvent-free Processing
- Solvothermal
- Sonic technology
- Spectroscopic techniques
- Spinels
- Spintronics
- Sputtering
- SSbD - safe and sustainable by design
- Structured surfaces
- Superalloy
- Supercapacitors
- Superhydrophobic
- Surface characterisation techniques
- Surface technologies
- Sustainable energy systems

- Sustainable processing
- Sustainable semiconductor processing
- Synthesis conditions
- Synthetic composites
- Tailored property
- Textile
- Textured surfaces
- Theoretical modeling
- Thermal
- Thermal management
- Thermal properties
- Thermal Spray
- Thermochemical materials
- Thermoelectric generators
- Thermoelectric materials
- Thermoelectric properties
- Thermoplastic
- Thermoplastic Processing
- Thermoresponsive polymer
- Thermoset
- Thin films
- Thin Layer Processing
- Tomography
- Topological structures
- Transducers
- Transfer rates
- Transition metals
- Transparent conductive films
- Transport properties
- Transportation sector
- Triboelectric materials
- Triboelectric properties
- Tribological properties
- Tubular structure
- Tunable materials
- Two-photon absorption
- Ultralow-power electronics
- Unconventional electronics
- Upcycling
- UV curing
- Vacuum metallization
- Veterinary medicine
- Vitrimer
- Waste recycling
- Waste reduction
- Wastewater treatment
- Water electrolysis
- Water management
- Water treatment
- Wear resistant coating
- Wearables
- Wide band gap oxides
- Wind turbines
- Wood
- X-ray tomography
- Zeolites
- Zinc oxide
- Zinc-ion batteries