

Keywords for *Scripta Materialia*

The keyword listing for *Scripta Materialia* is divided into five sections. **1. Synthesis and Processing; 2. Characterization; 3. Material Type; 4. Properties and Phenomena; and 5. Theory, Computer Simulations, and Modeling.** Authors should select a maximum of five (5) keywords from the five sections as appropriate and ensure that the keywords are included in their manuscript in accordance with the Notes for the Guidance of Authors. Where deemed necessary, authors may provide **one** keyword that does not appear on the listing. The total number of keywords must not exceed five.

The keywords selected will be used for search and retrieval purposes in an electronic environment as well as for the creation of subject indexes for *Scripta Materialia*. It is therefore recommended that authors pay careful attention to the selection of the keywords to ensure that they provide a useful description of the work being reported.

1. Synthesis and Processing

aging
annealing
anodization
atomization
ball mill
blending
bonding
casting
 die casting
 injection casting
 investment casting
 rheocasting
 squeeze casting
 suction casting
 thixocasting
chemical vapor deposition
chemical vapor transport
coating
cold working
crystal growth
 Bridgman technique
 Czochralski technique
deposition
 chemical vapor deposition (CVD)
 laser deposition
 molecular beam epitaxy (MBE)
 physical vapor deposition (PVD)
 sputtering
drawing
dynamic compaction
electroless plating
electron beam methods
electroplating
extrusion
firing
foaming
forming processes
 cold isostatic pressing (CIP)
 deep drawing
 drawing
 extrusion
 forging
 hot isostatic pressing (HIP)
 hot pressing
 rolling
 solid freeform processes
galvanization
high-speed deformation
homogenization/solutionization
hot working
implantation
infiltration
 liquid infiltration
 slurry infiltration
 vapor infiltration
ion-beam processing
isothermal heat treatments
 austempering
 martempering
joining
 brazing
 diffusion bonding
 soldering
laser treatment
 laser annealing
 laser deposition
 laser peening
 laser welding
liquid-phase epitaxy (LPE)
liquid-phase sintering
lithography
mechanical alloying
mechanical milling
melt spinning
metal injection moulding (MIM)
mineralization
molecular beam epitaxy (MBE)
nitriding
photochemical processing
plasma spraying
plating
polymer processing
powder consolidation
powder processing
quenching
reactive ion etching
recycling
rolling
self-propagating high-temperature synthesis (SHS)
semi-solid processing
severe plastic deformation (SPD)
 accumulative roll bonding (ARB)
 equal channel angular extrusion (ECAE)
 equal channel angular pressing (ECAP)
 friction
 high-pressure torsion
 torsion
sintering
 spark plasma sintering
sol-gel
solidification
 directional solidification
 eutectic solidification
 monotectic solidification

- multicomponent solidification
- peritectic solidification
- rapid solidification
- solidification microstructure
- spark plasma sintering
- spin coating
- splat quenching
- sputtering
- strain aging
- surface alloying
- surface modification
- tempering
- thermal barrier coating
- thermal spray processing
- thermomechanical processing
- thin films
- tissue engineering
- vapor deposition
- welding
 - friction stir welding
 - friction welding

2. Characterization

- acoustic methods
- activation analysis
- atom location by channeling enhanced microanalysis (ALCHEMI)
- atom probe tomography
- Brillouin scattering
- critical exponent analysis
- differential scanning calorimetry (DSC)
- differential thermal analysis (DTA)
- dynamic mechanical analysis
- electrical resistivity/conductivity
- electron diffraction
 - electron holography
 - electron scattering
- image analysis
 - sterology
 - 2D quantitative analysis
 - 3D reconstruction
- ion microprobe
- Kerr–Faraday–magnetometry
- mechanical properties testing
 - bending test
 - compression test
 - creep test
 - fatigue test
 - hardness test
 - high cycle fatigue
 - impact test
 - low cycle fatigue
 - microindentation
 - nanoindentation
 - scratch test
 - tension test
 - toughness
- microscopy and microanalysis techniques
 - analytical electron microscopy
 - atomic force microscopy (AFM)
 - atom-probe field-ion microscopy (AP-FIM)
 - convergent beam electron diffraction (CBED)
 - electron backscattering
 - electron backscattering diffraction (EBSD)

- electron backscattering patterns (EBSP)
- electron diffraction
- electron energy loss spectroscopy (EELS)
- electron holography
- electron probe microanalysis (EPMA)
- energy dispersive X-ray spectroscopy (EDXS)
- energy filtering transmission electron microscopy (EFTEM)
- field-ion microscopy (FIM)
- fluctuation electron microscopy (FEM)
- focused ion beam (FIB)
- high-angle annular dark field (HAADF)
- high-resolution electron microscopy (HREM)
- Lorenz microscopy
- magnetic force microscopy (MFM)
- optical microscopy
- orientation imaging microscopy (OIM)
- scanning electron microscopy (SEM)
- scanning/transmission electron microscopy (STEM)
- scanning tunneling microscopy (STM)
- three-dimensional atom probe (3DAP)
- transmission electron microscopy (TEM)
- wavelength dispersive X-ray spectroscopy (WDXS)
- Mössbauer effect
- nanoindentation
- neutron diffraction
- neutron scattering
- nuclear magnetic resonance (NMR)
- nuclear reaction analysis
- positron annihilation (PAL)
- radiography
- Rutherford backscattering spectrometry/channeling (RBS)
- small angle neutron scattering (SANS)
- small angle scattering (SAS)
- small angle X-ray scattering (SAXS)
- surface analysis techniques
 - Auger electron spectroscopy (AES)
 - deep level transient spectroscopy (DLTS)
 - ion scattering spectroscopy (ISS)
 - infrared (IR) spectroscopy
 - low-energy electron diffraction (LEED)
 - optical spectroscopy
 - Raman spectroscopy
 - reflection high-energy electron diffraction (RHEED)
 - secondary ion mass spectroscopy (SIMS)
 - X-ray photoelectron spectroscopy (XPS)
- thermally stimulated acoustic methods
- thermogravimetric analysis
- three-dimensional tomography
- X-ray
 - extended X-ray absorption fine structure (EXAFS)
 - line broadening
 - small angle X-ray scattering (SAXS)
 - synchrotron radiation
 - X-ray diffraction (XRD)
 - X-ray fluorescence
- Z-contrast microscopy

3. Material Type

- aerogel
- amorphous materials
 - alloys
 - block polymers

- carbon
- liquids
- polymers
- silicon
- beryllides
- biomaterials
 - bone
 - hydroxyapatite
 - polymeric biomaterials
 - polymers
- block copolymers
- borides
- buckminster fullerene
- bulk metallic glass
- carbides
- carbon and graphite
- carbon fiber-reinforced plastics
- carbon fibers
- carbon nanotubes
- carbon-carbon composites
- cellular materials
- cement and concrete
- ceramic thin films
- ceramics
- cermets
- chalcogenide glasses
- composites
 - ceramic matrix composites (CMC)
 - fiber reinforced composites
 - metal matrix composites (MMC)
 - particulate reinforced composites
 - polymer matrix composites
 - whisker reinforced composites
- compounds
 - intercalation compounds
 - intermetallic compounds
 - ionic compounds
 - semiconductor compounds
- cuprate superconductors
- diamond films
- diamond-like carbon
- diblock polymers
- dielectrics
- electroceramics
- electrochromics
- electronic ceramics
- electronic packaging
- fast-ion conductors
- fast-ion glasses
- ferrites
- ferroelectric ceramics
- ferroelectric materials
- ferromagnetic materials
- ferromagnetic semiconductor
- ferromagnetic shape memory alloy
- fibers
- foams
- fuel cell materials
- functionally graded materials (FGM)
- glass
- glass fiber
- granular materials
- half-metal
- Heusler phases
- high-temperature superconductors
- insulators
- intermetallics
 - iron aluminides
 - nickel aluminides
 - niobium aluminides
 - titanium aluminides
 - transition metal silicides
- ionic conductors
- hydrides
- Langmuir-Blodgett film
- laves phases
- layered structures
- lead-free solder
- liquids
- lithium-ion batteries
- low-dielectric materials
- luminescent materials
- macromolecular materials
- magnetic materials
 - exchange spring magnet
 - hard magnetic materials
 - magnetic random access memory (MRAM)
 - magnetic recording head
 - magnetic recording media
 - soft magnetic materials
- magnetostrictive materials
- metallic glass
 - bulk metallic glass (BMG)
- metal and alloys
 - alkaline earth
 - aluminum
 - aluminum alloys
 - copper
 - copper alloys
 - iron
 - iron alloys
 - magnesium
 - magnesium alloys
 - nickel
 - nickel alloys
 - platinum group
 - rare earth
 - refractory metals
 - semiconductor
 - steels
 - titanium
 - titanium alloys
 - transition metals
- metallizations
- microelectromechanical systems (MEMS)
- microelectronics packaging
- minerals
- multilayers
- nanocomposite
- nanocomposite magnet
- nanocrystalline materials
- nanocrystalline metal
- nanocrystalline soft magnetic material
- nanostructured materials
- nitrides
- optical materials
- optical waveguides
- optoelectronic packaging
- organic electronic materials
- oxide dispersion strengthened (ODS) alloy

- oxides
 - amorphous oxides
 - binary oxides
 - crystalline oxides
 - non-binary oxides
- permanent magnet
- perovskite
- piezoelectric ceramics
- polymers
- porous material
- quantum dots
- quantum wells
- quantum wires
- quasicrystal
- rare earth magnets
- semiconducting polymers
- semiconductors
 - compound semiconductors
 - elemental semiconductors
 - semiconductor devices
- semimetals
- sensors
- shape memory alloys (SMA)
 - ferromagnetic shape memory
- silica glass
- silicides
 - transition metal silicides
- solar cells
- sol-gel materials
- solid electrolytes
- steels
 - austenitic steels
 - bainitic steels
 - carbides
 - dual phases
 - ferritic steels
 - heat-resistant steels
 - high-strength low-alloy (HSLA) steels
 - interstitial free (IF) steels
 - maraging steels
 - martensitic steels
 - pearlitic steels
 - stainless steels
- superalloy
- superconductors
 - ceramic superconductors
 - low-temperature superconductors
 - metallic superconductors
 - organic superconductors
- thermoelectric materials
- thin films
 - coatings
 - magnetic recording media
 - magnetic thin films
 - multilayer thin films
- varistor
- waveguide
- whiskers
- zinc oxide

- buckling
- capillary phenomena
- catalysis
- cellular growth
- coarsening
- convection
- corrosion
- creep
 - rupture
 - Coble creep
- crystallization
- crystal defects
- crystal structure
- damping
- decomposition
 - clustering decomposition
 - ordering decomposition
 - spinodal decomposition
- defects
 - etching defects
 - lattice defects
 - point defects
 - defects in semiconductors
- deformation structure
- dendritic growth
- dielectric
- diffusion
 - bulk diffusion
 - grain boundary diffusion
 - interface diffusion
 - interstitial diffusion
 - ionic diffusion
 - liquid diffusion
 - pipe diffusion
 - stress-assisted diffusion
 - substitutional diffusion
 - surface diffusion
- diffusion-induced grain boundary motion (DIGM)
- directional crystallization
- directional solidification
- dislocation
 - dislocation boundaries
 - dislocation cell
 - dislocation dynamics
 - dislocation mobility
 - dislocation nucleation
 - dislocation structure
 - dislocation theory
- domains
 - antiphase domains
 - magnetic domains
 - ferroelectric domains
- dynamic phenomena
- electrical properties
- electrochemistry
- electromigration
- electronic structure
- embrittlement
 - grain boundary embrittlement
 - hydrogen embrittlement
 - impurity embrittlement
 - interstitial embrittlement
 - irradiation embrittlement
- environmental brittleness
- epitaxy

4. Properties and Phenomena

- acoustic
- atomic layer epitaxy

epitaxial growth
 facets
 fatigue
 ferroelectricity
 ferromagnetic shape memory
 flow-rate modulated epitaxy
 fractal
 fracture
 grain boundaries
 coincidence lattice
 grain boundary cohesion
 grain boundary defects
 grain boundary diffusion
 grain boundary embrittlement
 grain boundary energy
 grain boundary migration
 grain boundary segregation
 grain boundary sliding
 grain boundary strengthening
 grain boundary structure
 grain boundary wetting
 grain interfaces
 grain refining
 grain growth
 abnormal grain growth
 heteroepitaxy
 heterojunctions
 heterostructures
 homoepitaxy
 honeycomb structure
 hydride vapor phase epitaxy
 hydrogen
 hydrogen absorption
 hydrogen desorption
 hydrogen diffusion
 hydrogen embrittlement
 hydrogen storage
 interfaces
 interface antiphase
 interface defects
 interface dynamics
 interface migration
 interface structure
 interface wetting
 interlayer exchange coupling
 internal friction
 internal stresses
 lattice defects
 disclinations
 dislocations
 faults
 interstitials
 point defects
 vacancies
 magnetic properties
 coercivity
 exchange coupling
 hard magnets
 magnetic anisotropy
 magnetic domain
 magnetic recording
 magnetic structure
 magnetostriction
 soft magnets
 spin glass
 magnetoresistance
 colossal magnetoresistance (CMR)
 giant magnetoresistance (GMR)
 tunneling magnetoresistance (TMR)
 mechanical properties
 anelastic behavior
 Bauschinger effect
 brittle-to-ductile transition
 creep
 ductility
 dynamic strain aging
 elastic behavior
 erosion
 fatigue
 fracture
 Hall–Petch effect
 hardness
 high-temperature deformation
 impact behavior
 plastic deformation
 plasticity
 Portevin–Le Chetelier effect
 relaxation
 shear bands
 slip
 strain aging
 strain path change
 strain rate
 strain rate sensitivity
 stress relaxation
 stress rupture
 superplasticity
 thermally activated processes
 toughness
 twinning
 work hardening
 yield phenomena
 melting
 mesostructure
 metastable phases
 microstructure
 equiaxed microstructure
 nanocrystalline microstructure
 polyphase microstructure
 recrystallized microstructure
 texture
 ultrafine grained microstructure
 misorientation
 nanostructure
 nondestructive testing
 optical properties
 electro-optical effects
 optical absorption
 optical activity and birefringence
 optical emissivity
 optical reflectivity
 optical transmission
 photoelastic effects
 photorefractive effects
 ordering
 continuous ordering
 long-range ordering
 short-range ordering
 oxidation
 cyclic oxidation

- kinetics
- protective coating
- scale adhesion
- static oxidation
- percolation
- phase diagram
- phase transformations
 - crystallization
 - eutectic phase transformation
 - heterogeneous nucleation of phase transformations
 - homogeneous nucleation of phase transformations
 - martensitic phase transformation
 - massive phase transformation
 - nucleation of phase transformations
 - ordering
 - order–disorder phenomena
 - phase transformation kinetics
 - polymorphic phase transformation
 - precipitation
 - spinodal decomposition
- photonic structure
- piezoelectricity
- precipitation
- recovery
 - abnormal subgrain growth
 - annihilation
 - subgrain coalescence
 - subgrain growth
- recrystallization
 - dynamic recrystallization
 - nucleation of recrystallization
 - particle stimulated nucleation (PSN)
 - primary recrystallization
 - recrystallization kinetics
 - recrystallization texture
 - secondary recrystallization
 - static recrystallization
- residual stresses
- segregation
 - interface segregation
 - surface segregation
- self-assembly
- self-organization
- solidification
 - directional solidification
 - eutectic solidification

- kinetic solidification
- monotectic solidification
- multicomponent solidification
- peritectic solidification
- rapid solidification
- undercooling solidification
- spintronics
- superconductivity
- superheating
- superlattice
- surface
 - surface diffusion
 - surface energy
 - surface reconstruction
 - surface segregation
 - surface structure
- texture
- thermal conductivity
- twinning
- undercooling
- wear
- wetting

5. Theory, Computer Simulations, and Modeling

- ab initio calculation
- analytical methods
- CALPHAD
- cellular automaton
- cluster variation method
- density functional theory (DFT)
- first-principle calculation
- full-potential, linear-augmented plane wave method (FLAPW)
- kinetics
- micromechanical modeling
 - finite element analysis
 - mean field analysis
 - strain gradient plasticity
- modeling
- molecular dynamics (MD)
- Monte Carlo simulation
- phase-field model
- simulation
- statistical mechanics
- thermodynamics