

# Low Voltage Electron Microscope Applications Brochure





... your way to electron microscopy

# **LVEM 5 APPLICATIONS**

#### **Material Sciences**

Nanomaterials	
Polymers	
Chemistry	
Electron Diffraction	
Inspection	

#### Life Sciences

iochemistry	
Virology	
Pathology	
Botany	
Biology	

### nanomaterials



**TEM: PtNi Nanoparticles** *Particles on carbon film* 5–6 nm particles protected by organic surfactants



#### **TEM: PtNi Nanoparticles**

Particles on carbon film5–6 nm particles protected by organic surfactants



#### **TEM: PbS Nanoparticles**

Particles on carbon film 8 nm particles

### nanomaterials



#### **SEM: FeO Particles**

*Particles on stub* BSE. Uncoated particles with a few nm layer of silica coating on the surface



**SEM: FeO Particles** *Particles on stub* BSE. Uncoated particles with a few nm layer of silica coating on the surface



#### **SEM: FeO Particles**

Particles on stub BSE. Uncoated particles with a few nm layer of silica coating on the surface



#### **SEM: FeO Particles**

Particles on stub BSE. Uncoated particles with a few nm layer of silica coating on the surface

### nanomaterials



**TEM: FeO Nanoparticles** *Particles on carbon film* 15 nm particles



**TEM: FeO Nanoparticles** *Particles on carbon film* 15 nm particles



**TEM: FeO Nanoparticles** *Particles on carbon film* 15 nm particles



**TEM: FeO Nanoparticles** *Particles on carbon film* 15 nm particles

### nanomaterials



**TEM: Fe Nanoparticles** Particles on carbon film



**TEM: Fe Nanoparticles** Particles on carbon film



### **TEM: Fe Nanoparticles**

Particles on carbon film

### nanomaterials



**TEM: Au Nanoparticles** *Particles on carbon film* Gold particles



**TEM: Au Nanoparticles** *Particles on carbon film* Gold particles



## **TEM: Au Nanoparticles**

Particles on carbon film Gold particles



#### **TEM: Au Nanoparticles** *Particles on carbon film* Gold particles

### nanomaterials



**SEM: Au Nanoparticles** *Particles on stub* BSE. 80 nm particles on organic material



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SEM: Au Nanoparticles
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*Particles on stub* BSE. 80 nm particles on organic material



### SEM: Au Nanoparticles

*Particles on stub* BSE. 80 nm particles on organic material

### nanomaterials



**TEM: Au Nanoparticles** Particles on carbon film



**TEM: Au Nanoparticles** Particles on carbon film



**TEM: Au Nanoparticles** Particles on carbon film



**TEM: Au Nanoparticles** Particles on carbon film

### nanomaterials



**TEM: Ag Nanoparticles** Particles on carbon film



**TEM: Ag Nanoparticles** Particles on carbon film



**TEM: Ag Nanoparticles** Particles on carbon film



**TEM: Ag Nanoparticles** Particles on carbon film

### nanomaterials



**SEM: Ag on Polysulfone** *Sample on stub* BSE. Nanoparticles on filter material



**SEM: Ag on Polysulfone** *Sample on stub* BSE. Nanoparticles on filter material



**SEM: Ag on Polysulfone** *Sample on stub* BSE. Nanoparticles on filter material



**SEM: Ag on Polysulfone** *Sample on stub* BSE. Nanoparticles on filter material

### nanomaterials



**TEM: ZnO Nanoparticles** Particles on carbon film



**TEM: ZnO Nanoparticles** Particles on carbon film

## nanomaterials



**TEM: Yb Nanoparticles** Particles on carbon film



**TEM: Yb Nanoparticles** Particles on carbon film



#### **TEM: Yb Nanoparticles**

Particles on carbon film

### nanomaterials



**TEM: CdSe Quantum Dots** Particles on carbon film 6 nm particles



**TEM: CdSe Quantum Dots** Particles on carbon film 6 nm particles



#### **TEM: CdSe Quantum Dots**

Particles on carbon film 6 nm particles



#### **TEM: CdSe Quantum Dots** Particles on carbon film 6 nm particles

Nanomaterials

### nanomaterials



**TEM: Graphene Flakes** Particles on lacey carbon



**TEM: Graphene Flakes** Particles on lacey carbon



**TEM: Graphene Flakes** Particles on lacey carbon



**TEM: Graphene Flakes** Particles on lacey carbon

### nanomaterials



**TEM: Graphene Oxide Crystal** Particles on carbon film



**TEM: Graphene Oxide Crystal** Particles on carbon film



**TEM: Graphene Oxide Crystal** Particles on carbon film



**TEM: Graphene Oxide Crystal** Particles on carbon film

### nanomaterials



#### TEM: Protein-Bound Nanoparticles

Particles on carbon film



**TEM: Protein-Bound Nanoparticles** Particles on carbon film



#### TEM: Protein-Bound Nanoparticles

Particles on carbon film



TEM: Protein-Bound Nanoparticles

Particles on carbon film

### nanomaterials



**TEM: ZnO in Yoghurt** *Particles on carbon film* ZnO nanoparticles in yoghurt



**SEM: TiMoAl** *Particles on stub* BSE. Uncoated



**TEM: TiMoAl** Particles on carbon film diluted by IPA



**ED: TiMoAl** *Electron difraction* 

### nanomaterials



#### **TEM: TiSiO4 Nanoparticles** *Particles on carbon film* Nanoparticles in flour



**TEM: TISIO4 Nanoparticles** *Particles on stub* Nanoparticles in flour

### nanomaterials



**SEM: Diatoms** *Particles on stub* BSE. River sediment of diatoms and stones, uncoated



**SEM: Diatoms** *Particles on stub* BSE. River sediment of diatoms and stones, uncoated



**SEM: Diatoms** 

*Particles on stub* BSE. River sediment of diatoms and stones, gold coated



#### **SEM: Diatoms** Particles on stub

BSE. River sediment of diatoms and stones, gold coated

## nanomaterials



**TEM: Silica** *Particles on carbon film* Spherical nanoparticles 22 nm



**TEM: Silica** *Particles on carbon film* Spherical nanoparticles 22 nm

### nanomaterials



**TEM: Carbon Nanotubes** *Particles on carbon film* Uncoated



**TEM: Carbon Nanotubes** *Particles on carbon film* Uncoated



#### **TEM: Carbon Nanotubes**

*Sample on stub* Uncoated

## nanomaterials



#### SEM: ZnO Nanocomposite with Reduced Graphene Oxide

Particles on stub Point of interest: material morphology



#### SEM: ZnO Nanocomposite with Reduced Graphene Oxide

Particles on stub Point of interest: material morphology

### nanomaterials



**TEM: CdSe/ZnS Quantum Dots** *Particles on carbon film* Core covered by a gradient ZnS shell



**TEM: CdSe/ZnS Quantum Dots** *Particles on carbon film* Core covered by a gradient ZnS shell



#### **TEM: CdSe/CdS Quantum Dots**

Particles on carbon film CdSe core with CdS shell covered with oleic acid ligands attached to the surface



#### **TEM: CdSe/CdS Quantum Dots**

Particles on carbon film CdSe core with CdS shell covered with oleic acid ligands attached to the surface.

### polymers



**SEM: Polymer with Carbon Fiber** *Sample on stub* BSE. Gold coated carbon fiber composite material



**SEM: Polymer with Carbon Fiber** *Sample on stub* BSE. Gold coated carbon fiber composite material



**SEM: Polymer with Carbon Fiber** *Sample on stub* BSE. Gold coated carbon fiber composite material



**SEM: Polymer with Carbon Fiber** *Sample on stub* BSE. Gold coated carbon fiber composite material



**SEM: Opal Structure** *Sample on stub* BSE. Gold coated



**SEM: Opal Structure** *Sample on stub* BSE. Gold coated



**SEM: Opal Structure** Sample on stub BSE. Gold coated



**SEM: Opal Structure** *Sample on stub* BSE. Gold coated



**SEM: Opal Structure** *Sample on stub* BSE. Gold coated



**SEM: Opal Structure** *Sample on stub* BSE. Gold coated



**SEM: Opal Structure** *Sample on stub* BSE. Gold coated



**SEM: Opal Structure** *Sample on stub* BSE. Gold coated

## chemistry



**SEM: Limescale** *Particles on stub* BSE. Uncoated



**SEM: Limescale** *Particles on stub* BSE. Uncoated



**SEM: Limescale** *Particles on stub* BSE. Uncoated



**SEM: Limescale** *Particles on stub* BSE. Uncoated

## chemistry



#### **SEM: Limescale** *Particles on stub* BSE. Uncoated



**SEM: Limescale** *Particles on stub* BSE. Uncoated

## chemistry



**TEM: Mg Sulfonate** Particles on carbon film



**TEM: Mg Sulfonate** Particles on carbon film



**TEM: Mg Sulfonate** Particles on carbon film



**TEM: Mg Sulfonate** Particles on carbon film

## chemistry



**SEM: MgOH<sub>2</sub> Hexagonal Particles** *Particles on stub* Point of interest: shape of fire retardant particles



**TEM: CoFe<sub>2</sub>O<sub>4</sub> Magnetic NPs** *Particles on carbon film* Point of interest: 14 nm star-shaped particles



**TEM: CoFe<sub>2</sub>O<sub>4</sub> Magnetic NPs** *Particles on carbon film* Point of interest: 3 nm spherical particles



**TEM: CoFe<sub>2</sub>O<sub>4</sub> Magnetic NPs** *Particles on carbon film* Point of interest: 3 nm spherical particles

# chemistry



#### SEM: Delaminated Gadolinium Oxalate

*Particles on stub* Point of interest: particles size and structure



#### SEM: Delaminated Gadolinium Oxalate

*Particles on stub* Point of interest: particles size and structure



**SEM: CeO<sub>2</sub>** *Particles on carbon film* Point of interest: porous material with small grains

## electron diffraction



**ED: Gold Foil** 



**ED: Graphite Flake** 



ED: Graphene



#### **ED: Graphene**

### inspection



#### **SEM: Au grid 300nm** TEM grid

BSE. Point of interest: newly produced TEM grids quality



SEM: Au grid 300nm

*TEM grid* BSE. Point of interest: newly produced TEM grids quality



#### SEM: Au grid 200nm

*TEM grid* BSE. Point of interest: newly produced TEM grids quality



**SEM: Au grid 300nm** *TEM grid* BSE. Point of interest: newly produced TEM grids quality

# biochemistry



#### TEM: 20S Proteasome

Stained particles on carbon film Negative stained proteasomes purified from a Thermus thermophilus archeal lysate



#### **TEM: 20S Proteasome** Stained particles on carbon film

Negative stained proteasomes purified from a Thermus thermophilus archeal lysate



#### **TEM: 20S Proteasome**

Stained particles on carbon film Negative stained proteasomes purified from a Thermus thermophilus archeal lysate



#### **TEM: 20S Proteasome**

Stained particles on carbon film Negative stained proteasomes purified from a Thermus thermophilus archeal lysate

# biochemistry



#### **TEM: 20S Proteasome** Stained particles on carbon film Negative stained proteasomes purified fro

Negative stained proteasomes purified from a Thermus thermophilus archeal lysate



### TEM: 20S Proteasome

Stained particles on carbon film Negative stained proteasomes purified from a Thermus thermophilus archeal lysate



#### **TEM: 20S Proteasome**

*Stained particles on carbon film* Negative stained proteasomes purified from a Thermus thermophilus archeal lysate



#### **TEM: 20S Proteasome**

Stained particles on carbon film Negative stained proteasomes purified from a Thermus thermophilus archeal lysate

# biochemistry



### **TEM: Fatty Acid Synthase**

*Stained particles on carbon film* Negative stained fatty acid synthase complexes from yeast



**TEM: Fatty Acid Synthase** Stained particles on carbon film Negative stained fatty acid synthase complexes from yeast



#### **TEM: Fatty Acid Synthase**

*Stained particles on carbon film* Negative stained fatty acid synthase complexes from yeast



#### **TEM: Fatty Acid Synthase** Stained particles on carbon film

Negative stained fatty acid synthase complexes from yeast

# biochemistry



#### **TEM: Fatty Acid Synthase** Stained particles on carbon film Negative stained fatty acid synthase complexes from yeast



**TEM: Fatty Acid Synthase** Stained particles on carbon film Negative stained fatty acid synthase complexes from yeast



#### **TEM: Fatty Acid Synthase**

*Stained particles on carbon film* Negative stained fatty acid synthase complexes from yeast



**TEM: Fatty Acid Synthase** Stained particles on carbon film Negative stained fatty acid synthase complexes from yeast

# biochemistry



**TEM: Liposome Polymer** *Particles on carbon film* Gadolinium loaded liposome polymer-DNA complexes



**TEM: Liposome Polymer** *Particles on carbon film* Gadolinium loaded liposome polymer-DNA complexes

![](_page_38_Picture_6.jpeg)

### **TEM: Liposome Polymer**

Particles on carbon film Gadolinium loaded liposome polymer-DNA complexes

![](_page_38_Picture_9.jpeg)

**TEM: Liposome Polymer** *Particles on carbon film* Gadolinium loaded liposome polymer-DNA complexes

# biochemistry

![](_page_39_Picture_2.jpeg)

#### **TEM: Plasmids** Particles on carbon film

Shadowed

# biochemistry

![](_page_40_Picture_2.jpeg)

**TEM: 80S Ribosomes** Stained particles on carbon film Negative stained human 80S ribosomes

![](_page_40_Picture_4.jpeg)

**TEM: 80S Ribosomes** *Stained particles on carbon film* Negative stained human 80S ribosomes

# virology

![](_page_41_Picture_2.jpeg)

**TEM: Adenovirus** *Ultrathin stained section* A cell infected by adenovirus

![](_page_41_Picture_4.jpeg)

**TEM: Adenovirus** *Ultrathin stained section* A cell infected by adenovirus

![](_page_41_Picture_6.jpeg)

**TEM: Adenovirus** *Ultrathin stained section* A cell infected by adenovirus

![](_page_41_Picture_8.jpeg)

**TEM: Adenovirus** *Ultrathin stained section* A cell infected by adenovirus

# virology

![](_page_42_Picture_2.jpeg)

#### **TEM: Adenovirus** *Ultrathin unstained section* A cell infected by adenovirus

![](_page_42_Picture_4.jpeg)

**TEM: Adenovirus** *Ultrathin unstained section* A cell infected by adenovirus

![](_page_42_Picture_6.jpeg)

#### **TEM: Adenovirus**

*Ultrathin unstained section* A cell infected by adenovirus

## virology

![](_page_43_Picture_2.jpeg)

**TEM: Adeno-Associated Virus** Stained particles on carbon film Negative stained virus

![](_page_43_Picture_4.jpeg)

**TEM: Adeno-Associated Virus** Stained particles on carbon film Negative stained virus

![](_page_43_Picture_6.jpeg)

#### **TEM: Adeno-Associated Virus** Stained particles on carbon film

Negative stained virus

![](_page_43_Picture_9.jpeg)

**TEM: Adeno-Associated Virus** Stained particles on carbon film Negative stained virus

# virology

![](_page_44_Picture_2.jpeg)

**TEM: Norovirus** *Stained particles on quantifoil* Negative stained virus

![](_page_44_Picture_4.jpeg)

**TEM: Norovirus** *Stained particles on quantifoil* Negative stained virus

![](_page_44_Picture_6.jpeg)

**TEM: Norovirus** *Stained particles on quantifoil* Negative stained virus

![](_page_44_Picture_8.jpeg)

**TEM: Norovirus** *Stained particles on quantifoil* Negative stained virus

# virology

![](_page_45_Picture_2.jpeg)

**TEM: BK virus** Stained particles on carbon film Virus stained with 2% UAc

![](_page_45_Picture_4.jpeg)

**TEM: BK virus** Stained particles on carbon film Virus stained with 2% UAc

# virology

![](_page_46_Picture_2.jpeg)

**TEM: Bacteriophage** *Stained particles on carbon film* Virus negative stained by 2% of UA

![](_page_46_Picture_4.jpeg)

**TEM: Bacteriophage** *Stained particles on carbon film* Virus negative stained by 2% of UA

![](_page_46_Picture_6.jpeg)

#### **TEM: Bacteriophage**

*Stained particles on carbon film* Virus negative stained by 2% of UA

![](_page_46_Picture_9.jpeg)

**TEM: Bacteriophage** *Stained particles on carbon film* Virus negative stained by 2% of UA

# virology

![](_page_47_Picture_2.jpeg)

**TEM: Bacteriophage** *Particles on carbon film* Negative stained virus

![](_page_47_Picture_4.jpeg)

**TEM: Bacteriophage** *Particles on carbon film* Negative stained virus

## virology

![](_page_48_Picture_2.jpeg)

**TEM: Tobacco Mosaic Virus** *Stained particles on carbon film* Negative stained

![](_page_48_Picture_4.jpeg)

**TEM: Tobacco Mosaic Virus** *Stained particles on carbon film* Negative stained

![](_page_48_Picture_6.jpeg)

#### **TEM: Tobacco Mosaic Virus** Stained particles on carbon film Negative stained

![](_page_48_Picture_8.jpeg)

#### **TEM: Tobacco Mosaic Virus** *Stained particles on carbon film* Negative stained

## renal pathology

![](_page_49_Picture_2.jpeg)

**TEM: Kidney** *Stained ultrathin section* 20 nm section, point of interest: nucleus

![](_page_49_Picture_4.jpeg)

**TEM: Kidney** Stained ultrathin section 20 nm section

![](_page_49_Picture_6.jpeg)

**TEM: Kidney** *Stained ultrathin section* 20 nm section, point of interest: leukocyte in capilary

![](_page_49_Picture_8.jpeg)

**TEM: Kidney** *Stained ultrathin section* 20 nm section, point of interest: leukocyte in capilary

![](_page_50_Picture_2.jpeg)

#### **TEM: Kidney**

Ultrathin section 20 nm section, fixed by OsO4, point of interest: section microtubules (citas) in various orientation

![](_page_50_Picture_5.jpeg)

**TEM: Kidney** *Ultrathin section* 20 nm section, fixed by OsO<sub>4</sub>, point of interest: nucleus surrounded by mitochondria

![](_page_50_Picture_7.jpeg)

#### **TEM: Kidney**

Ultrathin section 20 nm section, fixed by OsO4, point of interest: nucleus surrounded by mitochondria

# pathology

![](_page_51_Picture_2.jpeg)

#### **TEM: Heart Muscle** *Ultrathin section* 20 nm section, fixed by OsO4, point of interest: mitochondrias and muscle fibres

![](_page_51_Picture_4.jpeg)

#### **TEM: Heart Muscle** *Ultrathin section* 20 nm section, fixed by OsO4, point of interest: mitochondrias and muscle fibres

![](_page_51_Picture_6.jpeg)

#### **TEM: Heart Muscle**

Ultrathin section 20 nm section, fixed by OsO4, point of interest: mitochondrias and muscle fibres

![](_page_51_Picture_9.jpeg)

#### **TEM: Heart Muscle**

Ultrathin section 20 nm section, fixed by OsO4, point of interest: mitochondrias and muscle fibres

# pathology

![](_page_52_Picture_2.jpeg)

#### **TEM: Muscle**

Ultrathin section 20 nm section, fixed by  $C_5H_8O_2$ , point of interest: structure of myofibrils and mitochondria

![](_page_52_Picture_5.jpeg)

**TEM: Brain** Stained ultrathin section 20 nm section

![](_page_52_Picture_7.jpeg)

**TEM: Brain** Stained ultrathin section 20 nm section

![](_page_53_Picture_2.jpeg)

**STEM: Spleen** Stained section 20 nm

Sample courtesy of Dobromila Klemová, Faculty of Medicine Masaryk University

## botany

![](_page_54_Picture_2.jpeg)

**SEM: Pollen Grains** *Particles on stub* BSE. Gold coated

![](_page_54_Picture_4.jpeg)

**SEM: Pollen Grains** *Particles on stub* BSE. Gold coated

![](_page_54_Picture_6.jpeg)

**SEM: Pollen Grains** *Particles on stub* BSE. Gold coated

![](_page_54_Picture_8.jpeg)

**SEM: Pollen Grains** *Particles on stub* BSE. Gold coated

![](_page_55_Picture_2.jpeg)

**SEM: Pollen Grains (Forsythia)** Particles on stub BSE. Gold coated

![](_page_55_Picture_4.jpeg)

**SEM: Pollen Grains (Forsythia)** *Particles on stub* BSE. Gold coated

![](_page_55_Picture_6.jpeg)

**SEM: Pollen Grains (Forsythia)** Particles on stub BSE. Gold coated

![](_page_55_Picture_8.jpeg)

**SEM: Pollen Grains (Forsythia)** *Particles on stub* BSE. Gold coated

### botany

![](_page_56_Picture_2.jpeg)

**SEM: Pollen Grains (Forsythia)** Particles on stub BSE. Gold coated

![](_page_56_Picture_4.jpeg)

**SEM: Pollen Grains (Forsythia)** *Particles on stub* BSE. Gold coated

![](_page_56_Picture_6.jpeg)

**SEM: Pollen Grains (Narcissus)** Particles on stub BSE. Gold coated

![](_page_56_Picture_8.jpeg)

**SEM: Pollen Grains (Narcissus)** *Particles on stub* BSE. Gold coated

### botany

![](_page_57_Picture_2.jpeg)

**SEM: Pollen Grains (Hibiscus)** Particles on stub BSE. Gold coated

![](_page_57_Picture_4.jpeg)

**SEM: Pollen Grains (Hosta)** *Particles on stub* BSE. Gold coated

![](_page_57_Picture_6.jpeg)

**SEM: Pollen Grains (Lily)** Particles on stub BSE. Gold coated

![](_page_57_Picture_8.jpeg)

**SEM: Pollen Grains (Chicory)** *Particles on stub* BSE. Gold coated

botany

![](_page_58_Picture_2.jpeg)

**SEM: Pollen Grains (Lupine)** *Particles on stub* BSE. Gold coated

![](_page_58_Picture_4.jpeg)

**SEM: Pollen Grains (Phlox)** *Particles on stub* BSE. Gold coated

![](_page_58_Picture_6.jpeg)

#### **SEM: Pollen Grains (Viburnum)** *Particles on stub* BSE. Gold coated

![](_page_58_Picture_8.jpeg)

**SEM: Pollen Grains (Daisy)** *Particles on stub* BSE. Gold coated

![](_page_59_Picture_2.jpeg)

## SEM: Pollen grains (Rabelera)

*Particles on stub* BSE. Gold coated

botany

![](_page_60_Picture_2.jpeg)

#### SEM: Pollen Grains (Linum Grandiflorum)

*Particles on stub* BSE. Gold coated

![](_page_60_Picture_5.jpeg)

#### SEM: Pollen Grains (Dandelion, Taraxacum Officinale)

*Particles on stub* BSE. Gold coated

# biology

![](_page_61_Picture_2.jpeg)

#### **SEM: Butterfly Wing** *Sample on stub* BSE. Gold coated

![](_page_61_Picture_4.jpeg)

**SEM: Butterfly Wing** Sample on stub BSE. Gold coated

![](_page_61_Picture_6.jpeg)

**SEM: Butterfly Wing** Sample on stub BSE. Gold coated

![](_page_61_Picture_8.jpeg)

**SEM: Butterfly Wing** *Sample on stub* BSE. Gold coated

# biology

![](_page_62_Picture_2.jpeg)

#### **SEM: Hair (Horse Tail)** Sample on stub BSE. Gold coated

![](_page_62_Picture_4.jpeg)

SEM: Hair (Horse Tail)

*Sample on stub* BSE. Gold coated

![](_page_62_Picture_7.jpeg)

### SEM: Hair (Horse Tail)

*Sample on stub* BSE. Gold coated

## agriculture

![](_page_63_Picture_2.jpeg)

**TEM: Tobacco Plant** Sample on stub Stained section with OsO<sub>4</sub>, 20 nm

![](_page_63_Picture_4.jpeg)

**TEM: Tobacco Plant** Sample on stub Stained section with OsO<sub>4</sub>, 20 nm