

## H10K

### ORGANIC ELECTRIC SOLID-STATE DEVICES

#### Definition statement

*This place covers:*

Electric solid-state devices having organic materials as the active layers, or using a combination of organic materials and other materials as the active layers.

This includes the following kind of devices:

- organic devices specially adapted for rectifying, amplifying, oscillating or switching, or capacitors or resistors having potential barriers, e.g. organic transistors or organic diodes;
- organic devices that are sensitive to infrared radiation, light, electromagnetic radiation of shorter wavelength or corpuscular radiation, e.g. organic solar cells or organic photodiodes;
- organic light-emitting devices, e.g. organic light-emitting diodes or organic light-emitting transistors.

Processes and apparatus specially adapted for the manufacture or treatment of such devices.

Organic materials used in active layers, layers having high carrier mobility or electrodes of devices covered by this subclass.

#### References

##### Limiting references

*This place does not cover:*

Organic resistors without potential barriers and not being specially adapted for integrated devices	<a href="#">H01C</a>
Organic capacitors, e.g. organic polymer capacitors, without potential barriers and not being specially adapted for integrated devices	<a href="#">H01G</a>
Organic electronic memory devices	<a href="#">H10B</a>
Organic thermoelectric devices; Organic thermomagnetic devices	<a href="#">H10N 10/00</a> , <a href="#">H10N 15/00</a> , <a href="#">H10N 19/00</a>
Organic piezoelectric or electrostrictive devices	<a href="#">H10N 30/00</a> , <a href="#">H10N 39/00</a>
Organic magnetostrictive devices	<a href="#">H10N 35/00</a> , <a href="#">H10N 39/00</a>
Organic galvanomagnetic or Hall-effect devices	<a href="#">H10N 50/00</a> , <a href="#">H10N 52/00</a> , <a href="#">H10N 59/00</a>
Organic superconducting devices	<a href="#">H10N 60/00</a> , <a href="#">H10N 69/00</a>
Organic solid-state devices without potential barriers, and specially adapted for rectifying, amplifying, oscillating or switching	<a href="#">H10N 70/00</a> , <a href="#">H10N 79/00</a>

##### References out of a residual place

*Examples of places in relation to which this place is residual:*

Organic magnets, inductors or transformers	<a href="#">H01F</a>
Organic electrolytic devices	<a href="#">H01G 9/00</a>
Organic batteries	<a href="#">H01M</a>
Organic waveguides	<a href="#">H01P</a>

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Use of organic solid-state devices for measuring	<a href="#">G01</a>
Control arrangements or circuits for electroluminescent panels comprising organic light-emitting diodes [OLED]	<a href="#">G09G 3/3208</a>
Organic electromechanical resonators	<a href="#">H03H</a>
Organic loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers, e.g. organic piezoelectric microphones	<a href="#">H04R</a>
Organic printed circuits, hybrid circuits, casings or constructional details thereof	<a href="#">H05K</a>

### Special rules of classification

The scheme covers five main aspects: (a) devices, e.g. components, are covered by groups [H10K 10/00](#), [H10K 30/00](#) and [H10K 50/00](#) (b) integrated devices and assemblies of multiple devices are covered by the groups [H10K 19/00](#), [H10K 39/00](#), [H10K 59/00](#) and [H10K 65/00](#), (c) processes and apparatus that are specially adapted for manufacturing or treating a device are covered in [H10K 71/00](#), (d) constructional details that may be generic to the devices of the subclass are covered in [H10K 77/00](#), (e) organic materials used in active layers, in layers having high carrier mobility, and in electrodes are covered in [H10K 85/00](#).

Determination should be made as which of the five aspect(s) is/are inventive. Classification of the inventive aspect(s) should be made using inventive allocation in the appropriate part(s) of the scheme. Classification of the remaining aspects should then be made using additional allocation only if disclosed in specific embodiments, e.g. a concrete device embodiment, or a synthesis method.

In this subclass, the periodic system used is the I to VIII group system indicated in the periodic table under Note (3) of section [C](#).

### Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

active material	The material within which the physical effects that are characteristic of the device occur.
auxiliary electrode	One part of a multilayered electrode, often being metallic and intended to increase the conductivity of transparent oxide electrodes.
coordination compound	A material having a chemical structure in which a central atom is chemically bonded to surrounding nonmetal atoms or groups of atoms. The central atom may be a metal atom or may be a metalloid (e.g. B, Si, Ge, As, Sb, Te, or Po).
dopant	The atoms or compounds added to a material during doping.
doping	Intentionally adding a small quantity of atoms or compounds into a material to alter its physical or electrical properties.
electroluminescent layer, emissive layer	The layer within which electrons and holes combine, resulting in light emission.
organic device	A device that comprises one or more organic materials as the active material, e.g. using only organic active materials or e.g. using a combination of an organic material and another material.

radiation-sensitive	Refers to a device or a component that is sensitive to infrared radiation, light, electromagnetic radiation of shorter wavelength or corpuscular radiation.
tandem OLED	An OLED that comprises multiple electroluminescent units between one set of electrodes and a charge generation layer between the electroluminescent units.
tandem PV cell	A photovoltaic cell that comprises multiple stacked photovoltaic units, e.g. p-n junctions, between one set of electrodes. Often each unit is made from a semiconductor of different bandgap energy, so each is sensitive to a different part of the electromagnetic spectrum.
terminal	The electrode or interconnection within a device, which serves as a connecting point between electrodes or interconnections within the device and interconnections that may be in the device's package or may be external to the device. An example is a bond pad on the cathode of an OLED, which may connect between the cathode electrode and a bonding wire in the OLED's package.
tiled display	A display that comprises a juxtaposition of smaller interconnected panels in order to achieve a large-area display.

### Synonyms and Keywords

*In patent documents, the following abbreviations are often used:*

CCM	Colour changing material
EBL	Electron blocking layer
EIL	Electron injection layer
EL	Electroluminescent; or electroluminescent layer
ETL	Electron transporting layer
FTO	Fluorine doped tin oxide
HBL	Hole blocking layer
HIL	Hole injection layer
HOIP	Hybrid organic-inorganic perovskite
HOMO	Highest occupied molecular orbital
HTL	Hole transporting layer
ITO	Indium tin oxide
LEC	Light-emitting electrochemical cell
LUMO	Lowest unoccupied molecular orbital
OEL	Organic electroluminescent layer
OLED	Organic light-emitting diode
OTFT	Organic thin-film transistor
PLED	Polymer light-emitting diode
RGB	Red Green Blue
RGBW	Red Green Blue White
TCO	Transparent conductive oxide

## H10K 10/00

**Organic devices specially adapted for rectifying, amplifying, oscillating or switching; Organic capacitors or resistors having potential barriers (integrated devices or assemblies of multiple devices [H10K 19/00](#))**

### Definition statement

*This place covers:*

Organic devices wherein an electrical input is rectified, amplified, oscillated or switched;

Active resistors or capacitors using organic materials as the active layers, or using a combination of organic materials with other material as the active layers.

Examples include:

- Organic variable resistors
- Organic variable capacitors
- Organic diodes
- Organic transistors

### References

#### Limiting references

*This place does not cover:*

Organic integrated devices, or assemblies of multiple devices	<a href="#">H10K 19/00</a>
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#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Manufacture or treatment specially adapted for organic devices	<a href="#">H10K 71/00</a>
Constructional details generally applicable to all organic solid-state devices, not covered by this group	<a href="#">H10K 77/00</a>
Organic material used in active layers, in layers having high carrier mobility, or in electrodes	<a href="#">H10K 85/00</a>
Inorganic devices specially adapted for rectifying, amplifying, oscillating or switching; Inorganic capacitors or resistors having potential barriers	<a href="#">H01L 29/00</a>

## H10K 10/20

### Organic diodes

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Organic light-sensitive diodes	<a href="#">H10K 30/10</a> , <a href="#">H10K 30/20</a> , <a href="#">H10K 30/30</a> , <a href="#">H10K 30/40</a>
Organic light-emitting diodes	<a href="#">H10K 50/10</a>

## H10K 10/46

Field-effect transistors, e.g. organic thin-film transistors [OTFT] ([H10K 10/43](#) takes precedence)

### References

#### Limiting references

*This place does not cover:*

Bipolar transistors, e.g. organic bipolar junction transistors [OBJTs]	<a href="#">H10K 10/43</a>
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#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

CHEMFETs	<a href="#">G01N 27/414</a>
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#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Organic light-sensitive transistors	<a href="#">H10K 30/65</a>
Organic light-emitting transistors	<a href="#">H10K 50/30</a>
Organic thin film transistors in an organic light-emitting display	<a href="#">H10K 59/125</a>

## H10K 19/00

Integrated devices, or assemblies of multiple devices, comprising at least one organic element specially adapted for rectifying, amplifying, oscillating or switching, covered by group [H10K 10/00](#)

### Definition statement

*This place covers:*

Integrated devices comprising at least one organic component specially adapted for rectifying, amplifying, oscillating or switching.

Assemblies of multiple devices, comprising at least one organic device specially adapted for rectifying, amplifying, oscillating or switching.

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Individual organic devices specially adapted for rectifying, amplifying, oscillating or switching	<a href="#">H10K 10/00</a>
Organic light-emitting display comprising organic thin film transistors	<a href="#">H10K 59/125</a>
Manufacture or treatment specially adapted for organic devices	<a href="#">H10K 71/00</a>
Constructional details generally applicable to all organic solid-state devices, not covered by this group	<a href="#">H10K 77/00</a>

Integrated devices comprising inorganic components specially adapted for rectifying, amplifying, oscillating or switching	<a href="#">H01L 27/02</a>
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## H10K 30/00

**Organic devices sensitive to infrared radiation, light, electromagnetic radiation of shorter wavelength or corpuscular radiation (integrated devices or assemblies of multiple devices [H10K 39/00](#), [H10K 65/00](#); electrolytic light-sensitive devices [H01G 9/20](#))**

### Definition statement

*This place covers:*

Devices specially adapted for sensing infra-red radiation, light, electro-magnetic radiation of shorter wavelength or corpuscular radiation and adapted for the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation using organic materials as the active layers, or using a combination of organic materials with other material as the active layers.

Examples include:

- Organic solar cells
- Organic photodiodes
- Organic phototransistors
- Organic photoresistors or photoconductors

[H10K 30/50](#) - [H10K 30/57](#) specifically cover photovoltaic cells. [H10K 30/60](#) - [H10K 30/65](#) specifically cover photodiodes, photoresistors and phototransistors. [H10K 30/10](#) - [H10K 30/451](#) cover structural or junction aspects of photovoltaic cells, photodiodes, photoresistors and phototransistors.

### References

#### Limiting references

*This place does not cover:*

Organic integrated devices, or assemblies of multiple devices	<a href="#">H10K 39/00</a> , <a href="#">H10K 65/00</a>
Electrolytic light-sensitive devices	<a href="#">H01G 9/20</a>

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Organic light-emitting devices	<a href="#">H10K 50/00</a>
Manufacture or treatment specially adapted for organic devices	<a href="#">H10K 71/00</a>
Constructional details generally applicable to all organic solid-state devices, not covered by this group	<a href="#">H10K 77/00</a>
Organic material used in active layers, in layers having high carrier mobility, or in electrodes	<a href="#">H10K 85/00</a>
Inorganic radiation-sensitive devices	<a href="#">H01L 31/00</a>

## H10K 39/00

**Integrated devices, or assemblies of multiple devices, comprising at least one organic radiation-sensitive element covered by group [H10K 30/00](#)**

### Definition statement

*This place covers:*

- Integrated devices comprising at least one component specially adapted for sensing infra-red radiation, light, electro-magnetic radiation of shorter wavelength or corpuscular radiation and adapted for the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation using organic materials as the active layers, or using a combination of organic materials with other material as the active layers; and
- Assemblies of multiple devices, comprising at least one device specially adapted for sensing infra-red radiation, light, electro-magnetic radiation of shorter wavelength or corpuscular radiation and adapted for the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation using organic materials as the active layers, or using a combination of organic materials with other material as the active layers.

Such as:

- Integrated devices comprising organic solar cells
- Organic photovoltaic modules
- Organic image sensors (imager structures)
- Organic X-ray detectors

### References

#### *Informative references*

*Attention is drawn to the following places, which may be of interest for search:*

Integrated devices, e.g. driving circuitry, comprising organic components specially adapted for rectifying, amplifying, oscillating or switching	<a href="#">H10K 19/00</a>
Individual organic radiation-sensitive components of these integrated devices	<a href="#">H10K 30/00</a>
Organic optocouplers	<a href="#">H10K 65/00</a>
Manufacture or treatment specially adapted for organic devices	<a href="#">H10K 71/00</a>
Constructional details generally applicable to all organic solid-state devices, not covered by this group	<a href="#">H10K 77/00</a>
Integrated devices, e.g. driving circuitry, comprising inorganic components specially adapted for rectifying, amplifying, oscillating or switching	<a href="#">H01L 27/02</a>
Integrated devices comprising inorganic radiation-sensitive components	<a href="#">H01L 27/14</a>
Integrated devices comprising inorganic photovoltaic cells	<a href="#">H01L 27/142</a>
Integrated devices comprising at least one inorganic radiation-sensitive element in which radiation controls the flow of current through the element such as photodiode arrays, e.g. inorganic CCDs	<a href="#">H01L 27/144</a>

## H10K 50/00

**Organic light-emitting devices (integrated devices or assemblies of multiple devices [H10K 59/00](#), [H10K 65/00](#); organic semiconductor lasers [H01S 5/36](#))**

### Definition statement

*This place covers:*

Organic electrical-light transducers wherein an electrical input is converted to a light output, such as organic light-emitting diodes [OLED] or organic light-emitting transistors.

### References

#### Limiting references

*This place does not cover:*

Organic integrated devices, or assemblies of multiple devices	<a href="#">H10K 59/00</a> , <a href="#">H10K 65/00</a>
Organic semiconductor lasers	<a href="#">H01S 5/36</a>

#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Lighting devices for vehicle interior	<a href="#">B60Q 3/00</a>
Light sources using semiconductor devices as light-generating elements, e.g. using light-emitting diodes [LED] or lasers	<a href="#">F21K 9/00</a>
Lighting devices intended for fixed installation	<a href="#">F21S 8/00</a>
Illumination devices for LCDs	<a href="#">G02F 1/1336</a>
Indicating arrangements making use of semiconductor devices	<a href="#">G09F 9/33</a>
Illuminated signs	<a href="#">G09F 13/00</a>

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Manufacture or treatment specially adapted for organic devices	<a href="#">H10K 71/00</a>
Constructional details generally applicable to all organic solid-state devices, not covered by this group	<a href="#">H10K 77/00</a>
Organic material used in active layers, in layers having high carrier mobility or in electrodes	<a href="#">H10K 85/00</a>
Luminescent or electroluminescent materials	<a href="#">C09K 11/00</a>
Light sources using luminescence, e.g. lamps based on OLEDs	<a href="#">F21K 2/00</a>
Details of lighting devices, of general application	<a href="#">F21V</a>
Control arrangements or circuits, of interest only in connection with visual indicators other than cathode-ray tubes, e.g. control arrangements for OLED displays	<a href="#">G09G 3/00</a>
Inorganic light-emitting diodes	<a href="#">H01L 33/00</a>
Electroluminescent light sources	<a href="#">H05B 33/00</a>



## Synonyms and Keywords

In patent documents, the following abbreviations are often used:

EL	Electroluminescent, electroluminescent layer
OEL	Organic electroluminescent layer
EIL	Electron injection layer
HIL	Hole injection layer
ETL	Electron transporting layer
HTL	Hole transporting layer
EBL	Electron blocking layer
HBL	Hole blocking layer
LEC	Light-emitting electrochemical cells
OLED	Organic light-emitting diode
TOLED	Transparent OLED
AMOLED display	Active matrix OLED display
PMOLED display	Passive matrix OLED display
OTFT	Organic thin film transistor
TFT	Thin film transistor
CCM	Colour changing medium
RGB	Red Green Blue
RGBW	Red Green Blue White

## H10K 59/00

**Integrated devices, or assemblies of multiple devices, comprising at least one organic light-emitting element covered by group [H10K 50/00](#)**

### Definition statement

*This place covers:*

Integrated devices that comprise at least one organic light-emitting component;

Assemblies of multiple devices, comprising at least one organic light-emitting device.

Examples include:

- Arrays of organic light-emitting diodes [OLEDs], e.g. OLED display
- An OLED integrated with a MOSFET

[H10K 59/10](#) covers only OLED displays, whereas [H10K 59/30](#) - [H10K 59/90](#) cover both displays and non-displays.

### References

#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Lighting devices for vehicle interior	<a href="#">B60Q 3/00</a>
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## Application-oriented references

Light sources using semiconductor devices as light-generating elements, e.g. using light-emitting diodes [LED] or lasers	<a href="#">F21K 9/00</a>
Lighting devices intended for fixed installation	<a href="#">F21S 8/00</a>
Illumination devices, e.g. backlights, for LCDs	<a href="#">G02F 1/1336</a>
Indicating arrangements making use of semiconductor devices	<a href="#">G09F 9/33</a>
Illuminated signs	<a href="#">G09F 13/00</a>

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Individual organic light-emitting components of these integrated devices	<a href="#">H10K 50/00</a>
Integrated devices comprising at least one organic light-emitting component and at least one organic radiation-sensitive component, e.g. organic opto-couplers	<a href="#">H10K 65/00</a>
Manufacture or treatment specially adapted for organic devices	<a href="#">H10K 71/00</a>
Constructional details generally applicable to all organic solid-state devices, not covered by this group	<a href="#">H10K 77/00</a>
Luminescent, e.g. electroluminescent materials	<a href="#">C09K 11/00</a>
Light sources using luminescence, e.g. lamps based on OLEDs	<a href="#">F21K 2/00</a>
Details of lighting devices, of general application	<a href="#">F21V</a>
Liquid crystal displays [LCD]	<a href="#">G02F 1/133</a>
Control arrangements or circuits, of interest only in connection with visual indicators other than cathode-ray tubes, e.g. control arrangements for OLED displays	<a href="#">G09G 3/00</a>
Plasma displays	<a href="#">H01J 11/00</a>
Field emission displays	<a href="#">H01J 31/00</a>
Integrated devices comprising inorganic light-emitting components, e.g. LED displays	<a href="#">H01L 27/15</a>
Electroluminescent light sources	<a href="#">H05B 33/00</a>
Circuit arrangements for operating LEDs comprising organic material	<a href="#">H05B 45/60</a>

**Glossary of terms**

In this place, the following terms or expressions are used with the meaning indicated:

OLED display	Organic light emitting diode display
TOLED display	Transparent OLED display
AMOLED display	Active matrix OLED display
PMOLED display	Passive matrix OLED display
OTFT array	Organic thin film transistor array
TFT array	Thin film transistor array
CCM	Colour changing medium
RGB	Red Green Blue
RGBW	Red Green Blue White

## H10K 59/10

### OLED displays

#### Relationships with other classification places

[H10K 59/10](#) covers only OLED displays. [H10K 59/30](#) - [H10K 59/90](#) cover displays, non-display integrated devices and non-display assemblies of multiple devices.

#### References

##### Informative references

Attention is drawn to the following places, which may be of interest for search:

Control arrangements for OLED displays	<a href="#">G09G 3/3208</a>
TFT arrays, per se	<a href="#">H01L 27/1214</a>

## H10K 65/00

Integrated devices, or assemblies of multiple devices, comprising at least one organic light-emitting element and at least one organic radiation-sensitive element, e.g. organic opto-couplers (organic image sensors integrated with organic light-emitting devices [H10K 39/34](#); OLED displays integrated with photosensors [H10K 59/13](#))

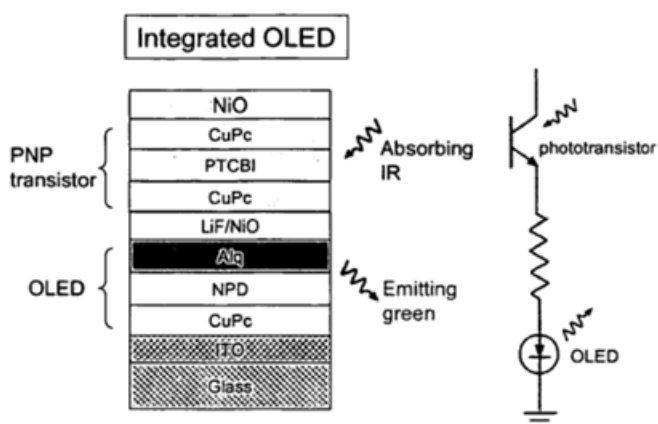
#### Definition statement

This place covers:

Integrated devices comprising at least one organic light-emitting component and at least one organic radiation-sensitive component, e.g. organic optocouplers;

Assemblies of multiple devices, comprising at least one organic light-emitting device and at least one organic radiation-sensitive device, e.g. organic optocouplers

Example:



The example shows a combination of an organic phototransistor with an OLED.

## References

### Limiting references

*This place does not cover:*

Organic image sensors integrated with organic light-emitting diodes	<a href="#">H10K 39/34</a>
OLED displays integrated with photosensors	<a href="#">H10K 59/13</a>

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Individual organic radiation-sensitive components of these integrated devices	<a href="#">H10K 30/00</a>
Individual organic light-emitting components of these integrated devices	<a href="#">H10K 50/00</a>
Manufacture or treatment specially adapted for organic devices	<a href="#">H10K 71/00</a>
Constructional details generally applicable to all organic solid-state devices, not covered by this group	<a href="#">H10K 77/00</a>
Inorganic optocouplers	<a href="#">H01L 31/12</a>

## H10K 71/00

### Manufacture or treatment specially adapted for the organic devices covered by this subclass

#### Definition statement

*This place covers:*

Processes or apparatus specially adapted for the formation of organic solid-state devices, including the formation, patterning or treatment of the organic materials used in active layers, in layers having high carrier mobility or in electrodes of an organic solid-state device.

## References

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Spraying apparatus	<a href="#">B05B 7/00</a>
Processes for applying liquids or other fluent materials	<a href="#">B05D 1/00</a>
Ink jet printers	<a href="#">B41J 2/01</a>
Printing processes to produce particular kinds of printed work	<a href="#">B41M 3/00</a>
Surface treatment of glass substrates by at least two coatings	<a href="#">C03C 17/34</a>
Joining glass to inorganic material or glass	<a href="#">C03C 27/00</a>
Etching, surface-brightening or pickling compositions	<a href="#">C09K 13/00</a>
Coating by vacuum evaporation, sputtering or by ion implantation of the coating forming material	<a href="#">C23C 14/00</a>
Chemical coating by decomposition of gaseous compounds	<a href="#">C23C 16/00</a>
Photomechanical, e.g. photolithographic, production of textured or patterned surfaces	<a href="#">G03F 7/00</a>
Manufacture or treatment for semiconductor devices	<a href="#">H01L 21/00</a>

## H10K 77/00

**Constructional details of devices covered by this subclass and not covered by groups [H10K 10/80](#), [H10K 30/80](#), [H10K 50/80](#) or [H10K 59/80](#)**

### Definition statement

*This place covers:*

This place covers details that are generic or generally applicable to all device types of [H10K](#), e.g. transparent or flexible substrates.

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Constructional details specific to organic devices specially adapted for rectifying, amplifying, oscillating or switching, or organic capacitors or resistors having potential barriers	<a href="#">H10K 10/80</a>
Constructional details specific to organic radiation-sensitive devices	<a href="#">H10K 30/80</a>
Constructional details specific to organic light-emitting devices	<a href="#">H10K 50/80</a>
Conductors or conductive bodies characterised by the conductive materials	<a href="#">H01B 1/00</a>
Insulators or insulating bodies characterised by the insulating materials	<a href="#">H01B 3/00</a>

## H10K 85/00

**Organic materials used in the body or electrodes of devices covered by this subclass**

### Definition statement

*This place covers:*

Organic materials in devices of this subclass, selected for their electrical or other properties, and used in

- Active layers, e.g. channel layers or light-emitting layers
- Layers having high carrier mobility, e.g. electron or hole transport layers
- Electrodes

### References

#### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Carbon; Compounds thereof, e.g. Fullerenes	<a href="#">C01B 32/00</a>
Cyclic hydrocarbons containing rings other than, or in addition to, six-membered aromatic rings	<a href="#">C07C 13/00</a>
Cyclic hydrocarbons containing only six-membered aromatic rings as cyclic parts	<a href="#">C07C 15/00</a>
Ketones; Ketenes	<a href="#">C07C 49/00</a>
Quinones	<a href="#">C07C 50/00</a>

## Informative references

Compounds containing amino groups bound to a carbon skeleton	<a href="#">C07C 211/00</a>
Heterocyclic compounds	<a href="#">C07D</a>
Macromolecular compounds obtained by reactions forming a carbon-to-carbon link in the main chain of the macromolecule	<a href="#">C08G 61/00</a>
Macromolecular compounds obtained by reactions forming a linkage containing nitrogen with or without oxygen or carbon in the main chain of the macromolecule	<a href="#">C08G 73/00</a>
Dyes with anthracene nucleus not condensed with any other ring	<a href="#">C09B 1/00</a>
Dyes with an anthracene nucleus condensed with one or more carbocyclic rings	<a href="#">C09B 3/00</a>
Dyes with an anthracene nucleus condensed with one or more heterocyclic rings with or without carbocyclic rings	<a href="#">C09B 5/00</a>
Acridine dyes	<a href="#">C09B 15/00</a>
Methine or polymethine dyes, e.g. cyanine dyes	<a href="#">C09B 23/00</a>
Porphines; Azaporphines	<a href="#">C09B 47/00</a>
Quinacridones	<a href="#">C09B 48/00</a>
Dyes of natural origin prepared from natural sources, e.g. vegetable sources	<a href="#">C09B 61/00</a>
Luminescent, e.g. electroluminescent, chemoluminescent materials	<a href="#">C09K 11/00</a>
Etching, surface-brightening or pickling compositions	<a href="#">C09K 13/00</a>
Liquid crystal materials	<a href="#">C09K 19/00</a>
Organic conductors, in general	<a href="#">H01B 1/12</a>
Organic insulators, in general	<a href="#">H01B 3/18</a>

### Special rules of classification

Special rules for classifying chemical compounds:

Markush formulae or generic formulae are not classified, only concrete embodiments or examples are classified. Simple lists of known compounds (without application in an example or embodiment) are not classified.

Fullerenes and carbon nanotubes are considered to be organic material. Graphene is considered to be inorganic.

In addition to the polymer classification, [H10K 85/10](#), the side-chains of aromatic or aliphatic polymers may be classified in the appropriate subgroup (e.g. [H10K 85/30](#), [H10K 85/40](#), [H10K 85/50](#), [H10K 85/60](#)).

Aromatic or aliphatic polymers comprising a metal complex in their main chain are classified in both [H10K 85/10](#) and in [H10K 85/30](#).

Silicon containing compounds are classified in [H10K 85/40](#) and are additionally classified in in [H10K 85/10](#), [H10K 85/20](#), [H10K 85/30](#), [H10K 85/50](#) and/or [H10K 85/60](#) as appropriate.

Ligands of metal complexes are not additionally classified in [H10K 85/60](#).