

## G21H

**OBTAINING ENERGY FROM RADIOACTIVE SOURCES; APPLICATIONS OF RADIATION FROM RADIOACTIVE SOURCES, NOT OTHERWISE PROVIDED FOR; UTILISING COSMIC RADIATION (measurement of nuclear or X-radiation [G01T](#); fusion reactors [G21B](#); nuclear reactors [G21C](#); lamps in which a gas filling is excited to luminescence by external corpuscular radiation or by radioactive material structurally associated with the lamp [H01J 65/04](#), [H01J 65/06](#))**

### Definition statement

*This place covers:*

Arrangements for obtaining electrical energy from radioactive sources, e.g. from radioactive isotopes.

Arrangements for direct conversion of radiation energy from radioactive sources into forms of energy other than electrical energy.

Applications of radiation from radioactive sources or arrangements therefor, not otherwise provided for.

Use of effects of cosmic radiation.

### References

#### Limiting references

*This place does not cover:*

Measurement of nuclear or X-radiation	<a href="#">G01T</a>
Fusion reactors	<a href="#">G21B</a>
Nuclear fission reactors	<a href="#">G21C</a>
Lamps in which a gas filling is excited to luminescence by external corpuscular radiation or by radioactive material structurally associated with the lamp	<a href="#">H01J 65/04</a>
Lamps in which a gas filling is excited to luminescence by radioactive material	<a href="#">H01J 65/06</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:*

Use of radiation to produce mutation in plants	<a href="#">A01H 1/06</a>
Preservation of meat, sausages, fish or fish products by irradiation without heating effect	<a href="#">A23B 4/015</a>
Preservation of eggs by irradiation without heating effect	<a href="#">A23B 5/015</a>
Preservation of fruits or vegetables by irradiation without heating effect	<a href="#">A23B 7/015</a>
Preservation of edible seeds by irradiation without heating effect	<a href="#">A23B 9/06</a>
Preservation of milk or milk preparations by irradiation	<a href="#">A23B 11/16</a>
Preservation of non-alcoholic beverages or foodstuffs by irradiation without heating	<a href="#">A23B 70/50</a>

## Application-oriented references

Medicinal preparations obtained by treating materials with wave energy or particle radiation	<a href="#">A61K 41/00</a>
Methods or apparatus using radiation for disinfecting or sterilising materials or objects other than foodstuffs or contact lenses	<a href="#">A61L 2/08</a>
Devices for implanting pellets, e.g. markers or solid medicaments	<a href="#">A61M 37/0069</a>
Radiation therapy	<a href="#">A61N 5/00</a>
Direct application of radiation to physical, chemical or physico-chemical processes in general	<a href="#">B01J 19/08</a>
Use of radiation for separating dispersed particles from gases or vapour, e.g. air or by electrostatic effect	<a href="#">B03C 3/38</a>
Use of radiation for pre-treatment of surfaces to which liquids or other fluent materials are to be applied or after-treatment of applied coatings	<a href="#">B05D 3/06</a>
Use of radiation in the working of plastics; After-treatment of articles without altering their shape; Apparatus therefor	<a href="#">B29C 71/04</a>
Railway trackside devices actuated by radiation and controlled by interaction with a vehicle or train	<a href="#">B61L 1/10</a>
Railway trackside devices using radiation to control devices on a vehicle or train	<a href="#">B61L 3/06</a>
Polymerisation initiated by wave energy or particle radiation; In addition polymers	<a href="#">C08F 2/46</a>
Processes for treating or compounding macromolecular substances by wave energy or particle radiation	<a href="#">C08J 3/28</a>
Chemical treatment or coating of shaped articles made of macromolecular substances using wave energy or particle radiation	<a href="#">C08J 7/18</a>
Use of radiation for cracking of hydrocarbon oils	<a href="#">C10G 15/10</a>
Refining of hydrocarbon oils by particle radiation	<a href="#">C10G 32/04</a>
Use of radiation for reforming naphtha	<a href="#">C10G 35/16</a>
Precipitation by f irradiations for pasteurisation, sterilisation, preservation, purification, clarification or ageing of alcoholic beverages	<a href="#">C12H 1/06</a>
Irradiation for pasteurisation, sterilisation, preservation, purification, clarification or ageing of alcoholic beverages	<a href="#">C12H 1/16</a>
Use of radiation for bleaching fibres, threads, yarns, fabrics, feathers or made-up fibrous goods, leather or furs	<a href="#">D06L 4/50</a>
Measuring angles, areas, length, thickness or similar dimensions, or irregularities of surfaces or contours, using wave or particle radiation	<a href="#">G01B 15/00</a>
Transducers not specially adapted for a specific variable using wave or particle radiation derived from a radioactive source	<a href="#">G01D 5/50</a>
Investigating fluid tightness of structures using radioactive material	<a href="#">G01M 3/20</a>
Investigating or analysing materials by the use of wave or particle radiation	<a href="#">G01N 23/00</a>
Investigating or analysing materials through the ionisation of gases, using wave or particle radiation to ionise a gas	<a href="#">G01N 27/64</a>
Production of immunochemical test materials with radioactive label	<a href="#">G01N 33/534</a>
Chemical analysis of biological material involving radioactive-labelled substances	<a href="#">G01N 33/60</a>

Geophysics; Prospecting or detecting using primary nuclear radiation sources	<a href="#">G01V 5/08</a>
Fire alarms or alarms responsive to explosion, actuated by the presence of smoke or gas detected by an ionisation chamber	<a href="#">G08B 17/11</a>
Carrying off electrostatic charges by means of ionising radiation	<a href="#">H05F 3/06</a>

**Informative references**

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

Preservation of milk or milk preparations	<a href="#">A23B 11/10</a>
Preservation of cream or cream preparations	<a href="#">A23B 11/30</a>
Preservation of butter or butter preparations	<a href="#">A23B 11/40</a>
Preservation of cheese or cheese preparations	<a href="#">A23B 11/60</a>
Introduction of isotopes of elements into organic compounds	<a href="#">C07B 59/00</a>
Techniques for handling particles or ionising radiation not otherwise provided for	<a href="#">G21K 1/00</a>
Particle spectrometer ion sources or ion guns using particle bombardment, e.g. ionisation chambers	<a href="#">H01J 49/14</a>
Lasers	<a href="#">H01S 3/00</a>
Semiconductor devices sensitive to electromagnetic or corpuscular radiation	<a href="#">H10F</a>

**G21H 1/00**

**Arrangements for obtaining electrical energy from radioactive sources, e.g. from radioactive isotopes {, nuclear or atomic batteries}**

**References****Informative references**

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

Photoelectric discharge tubes not involving the ionization of a gas	<a href="#">H01J 40/00</a>
Discharge tubes functioning as thermionic generators	<a href="#">H01J 45/00</a>
Tubes for determining the presence, intensity, density or energy of radiation or particles	<a href="#">H01J 47/00</a>
Thermoelectric devices comprising a junction of dissimilar materials	<a href="#">H10N 10/00</a>

**G21H 1/04**

**Cells using secondary emission induced by alpha radiation, beta radiation, or gamma radiation**

**References****Informative references**

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

Photoelectric discharge tubes not involving the ionisation of a gas	<a href="#">H01J 40/00</a>
Discharge tubes functioning as thermionic generators	<a href="#">H01J 45/00</a>
Tubes for determining the presence, intensity, density or energy of radiation or particles	<a href="#">H01J 47/00</a>

**G21H 1/06**

**Cells wherein radiation is applied to the junction of different semiconductor materials**

**References****Informative references**

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

Devices of the surface barrier or shallow PN junction detector type, e.g. surface barrier alpha-particle detectors	<a href="#">H10F 30/295</a>
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**G21H 1/08**

**Cells in which radiation ionises a gas in the presence of a junction of two dissimilar metals, i.e. contact potential difference cells**

**References****Informative references**

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

Electric discharge tubes or discharge lamps	<a href="#">H01J</a>
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**G21H 1/10**

**Cells in which radiation heats a thermoelectric junction or a thermionic converter**

**Definition statement**

*This place covers:*

Cells in which radiation of disintegration heat heats a thermoelectric junction or a thermionic converter.

## References

### Informative references

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

Devices where heating occurs from fission reactions	<a href="#">G21C 3/04</a>
Discharge tubes functioning as thermionic generators	<a href="#">H01J 45/00</a>
Thermoelectric devices comprising a junction of dissimilar materials	<a href="#">H10N 10/00</a>

## G21H 3/00

Arrangements for direct conversion of radiation energy from radioactive sources into forms of energy other than electric energy, e.g. {into} light {or mechanic energy}

## References

### Informative references

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

Lasers	<a href="#">H01S 3/00</a>
Lasers pumped by high energy nuclear particles	<a href="#">H01S 3/0957</a>
Gamma masers	<a href="#">H01S 4/00</a>

## G21H 3/02

in which material is excited to luminesce by the radiation (lamps in which a gas filling or screen or coating is excited to luminesce by radioactive material structurally associated with the lamp [H01J 65/00](#))

## References

### Limiting references

This place does not cover:

lamps in which a gas filling or screen or coating is excited to luminesce by radioactive material structurally associated with the lamp	<a href="#">H01J 65/00</a>
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### Informative references

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

Luminescent substances containing radioactive material	<a href="#">C09K 11/04</a>
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## G21H 5/00

**Applications of radiation from radioactive sources or arrangements therefor, not otherwise provided for**

### References

#### References out of a residual place

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

Use of radiation to produce mutations in plants	<a href="#">A01H 1/06</a>
Improving finished bakery products by irradiation	<a href="#">A21D 15/06</a>
Preservation of meat, sausages, fish, eggs, fruit, vegetables or edible seeds by irradiation causing heating effect	<a href="#">A23B 4/01</a> , <a href="#">A23B 5/01</a> , <a href="#">A23B 7/01</a> , <a href="#">A23B 9/04</a>
Preservation of meat, sausages, fish, eggs, fruit, vegetables or edible seeds by irradiation without heating effect	<a href="#">A23B 4/015</a> , <a href="#">A23B 5/015</a> , <a href="#">A23B 7/015</a> , <a href="#">A23B 9/06</a>
Preservation of milk or milk preparations by irradiation	<a href="#">A23B 11/16</a>
Preservation of food or foodstuffs or non-alcoholic beverages by irradiation without heating	<a href="#">A23B 70/50</a> , <a href="#">A23B 2/50</a>
Medicinal preparations obtained by treating materials with wave energy or particle radiation	<a href="#">A61K 41/00</a>
Preparations containing radioactive substances for use in therapy or testing in vivo	<a href="#">A61K 51/00</a>
Methods or apparatus using radiation for disinfecting or sterilising materials or objects other than foodstuffs or contact lenses	<a href="#">A61L 2/08</a>
Applying radioactive material to the body	<a href="#">A61M 37/00</a>
Radiation therapy; therapy using X-rays, gamma rays or particle-irradiation	<a href="#">A61N 5/00</a> , <a href="#">A61N 5/10</a>
Direct application of radiation to physical, chemical or physico-chemical processes in general	<a href="#">B01J 19/08</a>
Use of radiation for separating dispersed particles from gases or vapour, e.g. air, by electrostatic effect	<a href="#">B03C 3/38</a>
Use of radiation for pre-treatment of surfaces to which liquids or other fluent materials are to be applied, or after-treatment of applied coatings	<a href="#">B05D 3/06</a>
Use of radiation in the working of plastics; after-treatment of articles without altering their shape; apparatus therefor	<a href="#">B29C 71/04</a>
Railway trackside devices actuated by radiation and controlled by interaction with a vehicle or train	<a href="#">B61L 1/10</a>
Railway trackside devices using radiation to control devices on a vehicle or train	<a href="#">B61L 3/06</a>
Polymerisation initiated by wave energy or particle radiation; in addition polymers	<a href="#">C08F 2/46</a> , <a href="#">C08F 2/54</a> , <a href="#">C08G 2/02</a>
Processes for treating or compounding macromolecular substances by wave energy or particle radiation	<a href="#">C08J 3/28</a>
Chemical treatment or coating of shaped articles made of macromolecular substances using wave energy or particle radiation	<a href="#">C08J 7/18</a>
Use of radiation for cracking of hydrocarbon oils	<a href="#">C10G 15/10</a> , <a href="#">C10G 32/04</a>
Use of radiation for reforming naphtha	<a href="#">C10G 35/16</a>

Use of radiation for pasteurisation, sterilisation, preservation, purification, clarification or ageing of alcoholic beverages	<a href="#">C12H 1/06</a> , <a href="#">C12H 1/16</a>
Use of radiation for bleaching fibres, threads, yarns, fabrics, feathers, or made-up fibrous goods, leather or furs	<a href="#">D06L 4/50</a>
Measuring angles, areas, length, thickness or similar dimensions, or irregularities of surfaces or contours, using wave or particle radiation	<a href="#">G01B 15/00</a>
Transducers not specially adapted for a specific variable using wave or particle radiation derived from a radioactive source	<a href="#">G01D 5/50</a> , <a href="#">G01D 5/62</a>
Investigating fluid tightness of structures using radioactive material	<a href="#">G01M 3/20</a>
Investigating or analysing materials by the use of wave or particle radiation	<a href="#">G01N 23/00</a>
Investigating or analysing materials through the ionisation of gases, using wave or particle radiation to ionise a gas	<a href="#">G01N 27/64</a>
Chemical analysis of biological material; immunoassay or bio-specific binding assays involving radioactive-labelled substances	<a href="#">G01N 33/534</a> , <a href="#">G01N 33/60</a>
Geophysics; prospecting or detecting using primary nuclear radiation sources	<a href="#">G01V 5/08</a>
Fire alarms or alarms responsive to explosion, actuated by the presence of smoke or gas detected by an ionisation chamber	<a href="#">G08B 17/11</a>
Irradiation devices	<a href="#">G21K 5/00</a>
Gamma ray or X-ray microscopes	<a href="#">G21K 7/00</a>
In cathode ray tubes, charge-storage screens exhibiting internal electrical effects caused by particle radiation	<a href="#">H01J 29/44</a>
Lasers using pumping by high energy nuclear particles	<a href="#">H01S 3/0957</a>
Apparatus for generating ions to be introduced into non-enclosed gasses, e.g. into the atmosphere	<a href="#">H01T 23/00</a>
Carrying off electrostatic charges by means of ionising radiation	<a href="#">H05F 3/06</a>
Semiconductor devices sensitive to electro-magnetic or corpuscular radiation	<a href="#">H10F</a>

**Informative references**

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

Preservation of milk or milk preparations	<a href="#">A23B 11/10</a>
Preservation of cream or cream preparations	<a href="#">A23B 11/30</a>
Preservation of butter or butter preparations	<a href="#">A23B 11/40</a>
Preservation of cheese or cheese preparations	<a href="#">A23B 11/60</a>
Dairy products, making thereof	<a href="#">A23C</a>
Organic chemistry, applications of radiation for preparation of organic chemical compounds	<a href="#">C07</a>
Introducing isotopes into organic compounds	<a href="#">C07B 59/00</a>
Measuring	<a href="#">G01</a>

**G21H 5/02****as tracers****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:*

Medicinal preparations containing radioactive substances	<a href="#">A61K 51/00</a>
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***Informative references***

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

Investigating or analysing biological material	<a href="#">G01N 33/48</a>
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