VACUUM

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DESCRIPTION

Vacuum is an international rapid publications journal with a focus on short communication. All papers are peer-reviewed, with the review process for short communication geared towards very fast turnaround times. The journal also published full research papers, thematic issues and selected papers from leading conferences.

A report in Vacuum should represent a major advance in an area that involves a controlled environment at pressures of one atmosphere or below.

The scope of the journal includes:
1. Vacuum; original developments in vacuum pumping and instrumentation, vacuum measurement, vacuum gas dynamics, gas-surface interactions, surface treatment for UHV applications and low outgassing, vacuum melting, sintering, and vacuum metrology. Technology and solutions for large-scale facilities (e.g., particle accelerators and fusion devices). New instrumentation ( e.g., detectors and electron microscopes).
2. Plasma science; advances in PVD, CVD, plasma-assisted CVD, ion sources, deposition processes and analysis.
3. Surface science; surface engineering, surface chemistry, surface analysis, crystal growth, ion-surface interactions and etching, nanometer-scale processing, surface modification.

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AUDIENCE

Surface Scientists, Materials Scientists.

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GUIDE FOR AUTHORS

INTRODUCTION

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2. Plasma science; advances in PVD, CVD, plasma-assisted CVD, ion sources, deposition processes and analysis.

3. Surface science; surface engineering, surface chemistry, surface analysis, crystal growth, ion-surface interactions and etching, nanometer-scale processing, surface modification.


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1. Short Communications: should have the format of a letter (main text without headings) and are intended as brief reports of significant, original and timely research results, which require rapid publication. The submitted manuscripts should be kept concise and short; the number of figures and tables should also be kept to a minimum. See below for details. In considering a manuscript for publication, particular attention will be given to the originality of the research and the desirability of speedy publication and the clarity of the presentation. The editors will aim for a rapid review process and only manuscripts that need no changes or only minor revisions will be accepted.

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This journal accepts two different types of unsolicited manuscripts with different subdivision of text: Short Communications (Letters) and Full Research Papers.

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The described research should be complete and thorough, and there are no limitations to text or number of figures/tables, as long as they add to the understanding of the described research. The main text of your article should be divided into clearly defined and numbered sections with appropriate headings (Introduction, Materials and Methods, Theory/Calculation, Results, Discussion, Conclusions).
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*Introduction*

State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

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*Results*

Results should be clear and concise.

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*Conclusions*

The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.

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A self-contained abstract of up to 150 words for Short Communications (Letters) and 200 words for Full Research Papers, outlining in a single paragraph the purpose of the research, the principal results and major conclusions. An abstract is often presented separate from the article, so it must be able
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Units to be used in 'Vacuum'
Pressure: Authors are asked to use bar (bar), millibar (mbar) or the pascal (Pa).

The SI unit of pressure is the pascal (Pa), the special name for the newton per square metre (N m⁻²). The standard atmosphere (atm) is defined in ISO 31/111-1978 (E) as exactly 101.325 kPa. The standard atmosphere should only be used to define a reference environment and not as a pressure unit. The 'bar' has become widely used as a unit of pressure in vacuum measurement.
1 bar = $10^5$ Pa exactly
1 millibar (mbar) = 100 Pa exactly.

Other units of pressure are sometimes to be found in published literature but their use is deprecated in ISO 31/111-1978(E) and in some countries their use is unlawful for certain purposes. A table of conversion factors for such units is given below to allow authors to change their units to pascals or millibars.

The pascal can be combined with other SI units to give the units for other quantities commonly measured in vacuum science and technology. Some examples of these quantities are given below.

**Pump speed:** Authors are asked to use cubic metre per second ($m^3 \ s^{-1}$), cubic metre per hour ($m^3 \ h^{-1}$), or litre per second ($l \ s^{-1}$).

The SI unit for volumetric rate of flow such as is used when expressing the speed of a vacuum pump is cubic metre per second ($m^3 \ s^{-1}$). The speed of most mechanical pumps is expressed in terms of cubic metre per hour ($m^3 \ h^{-1}$).

\[ 1 \ m^3 \ h^{-1} = \frac{1}{3600} \ m^3 \ s^{-1} = 0.000278 \ m^3 \ s^{-1}. \]

The speed of most high vacuum pumps such as diffusion and turbomolecular pumps is expressed in terms of liter per second ($l \ s^{-1}$).

\[ 1 \ l \ s^{-1} = 10^{-3} \ m^3 \ s^{-1}. \]

**Leak rate:** Authors are asked to use pascal metre cube per second (Pa $m^3 \ s^{-1}$) or millibar litre per second (mbar $l \ s^{-1}$).

The SI unit for leak rate is pascal metre cube per second (Pa $m^3 \ s^{-1}$). Other commonly used units of leak rate with their conversion to the SI unit are given in the table.

**Outgassing rate:** Authors are asked to use pascal metre cube per second per square metre (Pa $m^3 \ s^{-1} \ m^{-2}$) or millibar litre per second per square centimetre (mbar $l \ s^{-1} \ cm^{-2}$).

The SI unit for outgassing rate from surfaces is pascal metre cube per second per square metre (Pa $m^3 \ s^{-1} \ m^{-2}$). Other commonly used units of outgassing rate with their conversion to the SI unit are given in the table.

<table>
<thead>
<tr>
<th>(1) Quantity measured in (2)</th>
<th>Multiply by (3) Resulting number in (4) Multiply column (3) by (5) Resulting number in torr</th>
<th>133.322 Pa</th>
<th>0.01 mbar mm Hg</th>
<th>133.322 Pa</th>
<th>0.01 mbar micron</th>
<th>0.133322 Pa</th>
<th>0.01 mbar technical atmospheres (kgf $cm^{-2}$)</th>
<th>98.0665 kPa</th>
<th>10 mbar $m^3 \ h^{-1}$</th>
<th>0.000278 $m^3 \ s^{-1}$</th>
<th>ls$^{-1}$</th>
<th>0.001 $m^3 \ s^{-1}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4) Multiply</td>
<td>(5)</td>
<td>Resulting</td>
<td>number in torr</td>
<td>133.322 Pa</td>
<td>0.01 mbar mm Hg</td>
<td>133.322 Pa</td>
<td>0.01 mbar micron</td>
<td>0.133322 Pa</td>
<td>0.01 mbar technical atmospheres (kgf $cm^{-2}$)</td>
</tr>
<tr>
<td>Pump speed</td>
<td>Authors are asked to use cubic metre cube per second ($m^3 \ s^{-1}$), cubic metre per hour ($m^3 \ h^{-1}$), or litre per second ($l \ s^{-1}$).</td>
<td>The SI unit for volumetric rate of flow such as is used when expressing the speed of a vacuum pump is cubic metre per second ($m^3 \ s^{-1}$). The speed of most mechanical pumps is expressed in terms of cubic metre per hour ($m^3 \ h^{-1}$).</td>
<td>$1 \ m^3 \ h^{-1} = \frac{1}{3600} \ m^3 \ s^{-1} = 0.000278 \ m^3 \ s^{-1}$.</td>
<td>The speed of most high vacuum pumps such as diffusion and turbomolecular pumps is expressed in terms of liter per second ($l \ s^{-1}$).</td>
<td>$1 \ l \ s^{-1} = 10^{-3} \ m^3 \ s^{-1}$.</td>
<td></td>
<td>Leak rate</td>
<td>Authors are asked to use pascal metre cube per second (Pa $m^3 \ s^{-1}$) or millibar litre per second (mbar $l \ s^{-1}$).</td>
<td>The SI unit for leak rate is pascal metre cube per second (Pa $m^3 \ s^{-1}$). Other commonly used units of leak rate with their conversion to the SI unit are given in the table.</td>
<td>Outgassing rate</td>
<td>Authors are asked to use pascal metre cube per second per square metre (Pa $m^3 \ s^{-1} \ m^{-2}$) or millibar litre per second per square centimetre (mbar $l \ s^{-1} \ cm^{-2}$).</td>
<td>The SI unit for outgassing rate from surfaces is pascal metre cube per second per square metre (Pa $m^3 \ s^{-1} \ m^{-2}$). Other commonly used units of outgassing rate with their conversion to the SI unit are given in the table.</td>
</tr>
</tbody>
</table>
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