SYSTEM AND METHOD FOR CHARACTERIZING A SAMPLE BY LOW-FREQUENCY SPECTRA

Abstract: The method and an apparatus are included for interrogating a sample (200) that exhibits molecular rotation. The sample is placed in a container (50) having both magnetic and electromagnetic shielding, and Gaussian noise is injected into the sample. An electromagnetic time-domain noise composed of sample source radiation superimposed on the injected noise is detected. This signal is cross-correlated with a second time-domain signal that produced by same sample for a cross-correlated signal with frequency domain components. The signal is plotted by a fast Fourier transform "FFT" to produce a frequency domain spectrum on a frequency range within DC to 50KHz. From this spectrum, one or more low frequency signal components that are characteristic of the sample being interrogated are identified.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
   IPC(7) : G01R 33/02
   US CL. : 324/248

   According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

   Minimum documentation searched (classification system followed by classification symbols)
   U.S. : 324/248

   Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
   NONE

   Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
   USPTO APS EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>US 5,5 74,369 A (HIBBS) 12 November 1996 (12.11.1996), see entire document.</td>
<td>1-30</td>
</tr>
<tr>
<td>Y</td>
<td>US 5,343,147 A (SAGER et al) 30 August 1994 (30.08.1994), see entire document.</td>
<td>1-30</td>
</tr>
</tbody>
</table>

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* * Special categories of cited documents:
   "A" document defining the general state of the art which is not considered to be
   of particular relevance
   "E" earlier application or patent published on or after the international filing date
   "L" document which may throw doubt on priority claim(s) or which is cited to
   establish the publication date of another citation or other special reason (as
   specified)
   "O" document referring to an oral disclosure, use, exhibition or other means
   "P" document published prior to the international filing date but later than the
   priority date claimed
   "T" later document published after the international filing date or priority
   date and not in conflict with the application but cited to understand the
   principle or theory underlying the invention
   "X" document of particular relevance; the claimed invention cannot be
   considered novel or cannot be considered to involve an inventive step
   when the document is taken alone
   "Y" document of particular relevance; the claimed invention cannot be
   considered to involve an inventive step when the document is
   combined with one or more other such documents, such combination
   being obvious to a person skilled in the art
   "A" document member of the same patent family

Date of the actual completion of the international search
27 July 2003 (27.07.2003)

Date of mailing of the international search report
09 SEP 2003

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
Facsimile No. (703) 305-3230

Authorized officer
SUBHASH ZAVERI
Telephone No. (703) 308-0750

Form PCT/ISA/210 (second sheet) (July 1998)