

## Refractive Index Measurement of Solids

| Details of measurements  |                                                                      |                                                                                 |
|--------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Material characteristics | Materials                                                            | Measurement method                                                              |
| Isotropic materials      | Optical glass, Silica glass, etc.                                    | Refractometer (V-Block method)<br>or<br>Spectrometer (Minimum deviation method) |
|                          | Crystals of cubic system<br>(CaF <sub>2</sub> , Si, ZnS, ZnSe ,etc)  |                                                                                 |
|                          | Plastics (without birefringence)                                     | Refractometer (V-Block method)                                                  |
|                          | Porous Glasses ( $n \approx 1.03$ )                                  | Spectrometer (Minimum deviation method)                                         |
| Anisotropy materials     | Uniaxial crystals<br>(Quartz, TiO <sub>2</sub> , Sapphire, LBO, etc) | Refractometer (V-Block method)<br>or<br>Spectrometer (Minimum deviation method) |

| Available spectral lines and measurement accuracy |         |         |                                    |                                                                    |                                                              |                                                             |                                                             |
|---------------------------------------------------|---------|---------|------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|
| Spectral lines                                    |         |         |                                    | Measurement Equipment                                              |                                                              |                                                             |                                                             |
|                                                   |         |         |                                    | MÖLLERWEDEL                                                        |                                                              |                                                             | Carl Zeiss Jena                                             |
| Wavelength                                        |         | Symbols | Symbols of lamps<br>(Light source) | Super-Precision Spectrometer<br>Type 1                             |                                                              | Precision<br>Spektrometer<br>Type 2                         | Refractometer<br>Type PR-2                                  |
|                                                   |         |         |                                    | Ultra precision<br>Measurement<br>Equipment<br>[10 <sup>-6</sup> ] | Precision<br>Measurement<br>Equipment<br>[10 <sup>-5</sup> ] | Standard<br>Measurement<br>Equipment<br>[10 <sup>-5</sup> ] | Standard<br>Measurement<br>Equipment<br>[10 <sup>-5</sup> ] |
| 2325,42                                           | 2326,05 |         | Hg                                 | ± 5                                                                | ± 3                                                          | x                                                           | x                                                           |
| 1970,09                                           | 1970,63 |         | Hg                                 | ± 5                                                                | ± 3                                                          | x                                                           | x                                                           |
| 1529,58                                           | 1530    |         | Hg                                 | ± 5                                                                | ± 3                                                          | x                                                           | x                                                           |
| 1128,64                                           | 1128,95 |         | Hg                                 | ± 5                                                                | ± 3                                                          | x                                                           | x                                                           |
| 1013,98                                           | 1014,26 | t       | Hg                                 | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 5                                                         |
| 852,11                                            | 852,344 | s       | Cs                                 | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 5                                                         |
| 780,023                                           | 780,237 |         | Rb                                 | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 5                                                         |
| 706,519                                           | 706,714 | r       | He                                 | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 5                                                         |
| 656,273                                           | 656,454 | C       | H <sub>2</sub>                     | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 3                                                         |
| 643,847                                           | 644,025 | C'      | Cd                                 | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 3                                                         |
| 632,82                                            | 632,99  |         | He-Ne                              | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 3                                                         |
| 587,562                                           | 587,725 | d       | He                                 | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 3                                                         |
| 546,075                                           | 546,227 | e       | Hg                                 | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 3                                                         |
| 486,133                                           | 486,269 | F       | H <sub>2</sub>                     | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 3                                                         |
| 479,992                                           | 480,126 | F'      | Cd                                 | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 3                                                         |
| 435,835                                           | 435,957 | g       | Hg                                 | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 3                                                         |
| 404,656                                           | 404,77  | h       | Hg                                 | ± 2                                                                | ± 1                                                          | ± 3                                                         | ± 5                                                         |
| 365,015                                           | 365,119 | i       | Hg                                 | ± 2                                                                | ± 1                                                          | ± 3                                                         | x                                                           |
| 334,148                                           | 334,244 |         | Hg                                 | ± 5                                                                | ± 1                                                          | x                                                           | x                                                           |
| 289,36                                            | 289,444 |         | Hg                                 | ± 5                                                                | ± 1                                                          | x                                                           | x                                                           |
| 253,652                                           | 253,728 |         | Hg                                 | ± 5                                                                | ± 1                                                          | x                                                           | x                                                           |
| 228,802                                           | 228,872 |         | Cd                                 | ± 5                                                                | ± 1                                                          | x                                                           | x                                                           |
| 214,438                                           | 214,506 |         | Cd                                 | ± 5                                                                | ± 1                                                          | x                                                           | x                                                           |
| 206,2                                             | 206,266 |         | Zn                                 | ± 5                                                                | ± 1                                                          | x                                                           | x                                                           |
| -                                                 | 194,227 |         | Hg                                 | ± 5                                                                | ± 3                                                          | x                                                           | x                                                           |
| -                                                 | 184,95  |         | Hg                                 | ± 5                                                                | ± 3                                                          | x                                                           | x                                                           |

## Refractive Index Measurement of Liquids

| Details of measurements  |                                                                                                                                                                               |                                 |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Material characteristics | Materials                                                                                                                                                                     | Measurement method              |
| Liquid like              | Oil, Alcohol, Water, etc.                                                                                                                                                     | Refractometer (V-Block methode) |
| Greasy                   | Greasy oil                                                                                                                                                                    |                                 |
|                          | The measurement of liquid and solid substances is limited to the following wavelengths :<br>t,s 780nm; r,C,C' 633nm; d,e,F,F' & g [Measuring accuracy ; ±1×10 <sup>-4</sup> ] |                                 |