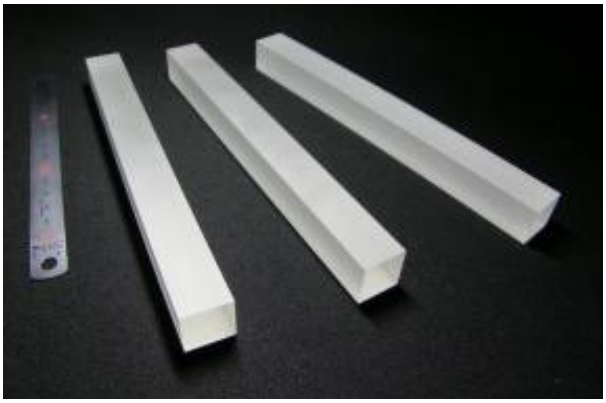
New!

"BSO is now available for High Energy & Nuclear Physics Research"

Large-size BSO now available for the first time on a commercial scale from OXIDE. Try this unique scintillator crystal, for a breakthrough in your research.

BSO Advantages:

- three times as fast response and better radiation hardness than BGO
- absence of hygroscopicity and shorter radiation length than CsI
- ten times more light output than PWO



【Scintillators for High Energy and Nuclear Physics Research】

Scintillator	Decay	Density	Light yield	Hygroscopicity	Cost
$Bi_4Si_3O_{12}$ (BSO)	○	○	○	○	○
$Bi_4Ge_3O_{12}$ (BGO)	△	○	○	○	○
BaF_2	△	△	○	○	○
NaI:Tl	△	×	○	×	○
CsI:Tl	×	△	○	△	○
CsI	○	△	○	△	○
$PbWO_4$ (PWO)	○	○	△	○	○
Lu_2SiO_5:Ce (LSO)	○	○	○	○	×
Gd_2SiO_5:Ce (GSO)	○	○	○	○	×

○: excellent △: fair ×: poor

OXIDE ***Oxide Corporation***

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【Physical properties of BSO】

- Effective atomic number: 73
- Density : 6.80 (g/cm^3)
- Radiation length : 11.5 (mm)
- Peak emission : 480 (nm)
- Decay constant (nsec): 99(82%), 26(12%), 2.4(6%)
- Radiation hardness : 10^5-10^6 (rad)
- Refractive index : 2.06
- d(LY)/dT : -2 (%K)
- Cleavage : No
- Hygroscopicity : No
- Hardness (Mohs) : 6
- Melting point : 1300 (K)

(M.Ishii et.al, Optical Materials 19(2002)201)

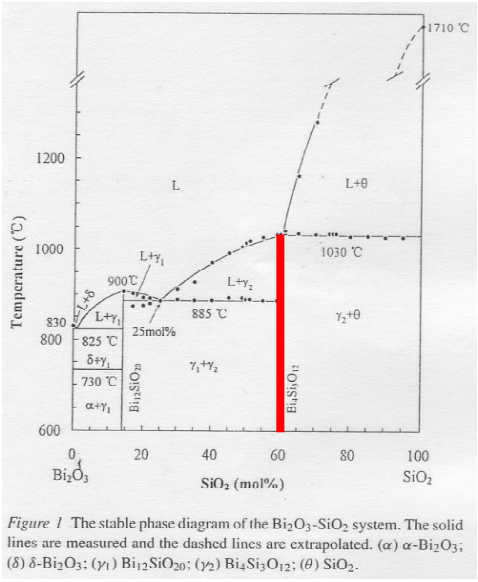


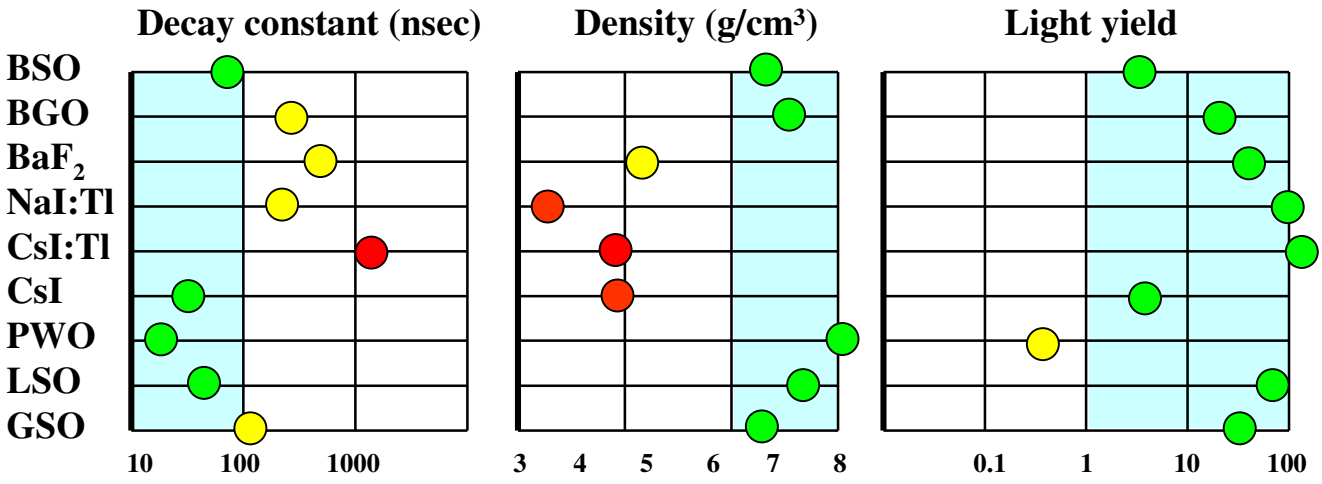
Figure 1 The stable phase diagram of the Bi_2O_3-SiO_2 system. The solid lines are measured and the dashed lines are extrapolated. (α) α-Bi_2O_3; (δ) δ-Bi_2O_3; (γ_1) $Bi_{12}SiO_{20}$; (γ_2) $Bi_4Si_3O_{12}$; (θ) SiO_2.

(Phase diagram)

【Relative scintillation characteristics】

Scintillator	Decay time (nsec)	Density (g/cm^3)	Radiation length (cm)	Light yield (relative)
$Bi_4Si_3O_{12}$ (BSO)	2.4/26/99*	6.80**	1.15**	0.25/0.5/3.4*
$Bi_4Ge_3O_{12}$ (BGO)	300	7.13	1.12	21
BaF_2	0.9/630	4.89	2.03	3.4/36
NaI:Tl	230	3.67	2.59	100
CsI:Tl	1300	4.51	1.86	165
CsI (pure)	6/35	4.51	1.86	1.1/3.6
$PbWO_4$ (PWO)	10/30	8.3	0.89	0.29/0.083
Lu_2SiO_5:Ce (LSO)	40	7.40	1.14	83
Gd_2SiO_5:Ce (GSO)	56/600	6.71	1.38	30/3

C. Amsler, et al., Physics Letters B 667(2008)1
*M.Ishii, et.al, Optical Materials 19(2002)201
**H.Shimizu, et.al, NIMPR A 550(2005)258



(Blue region is suitable for High Energy Physics Research in the future)

New!

OXIDE is now ready for industrial-level BSO supply

＜Crystal Growth＞

BSO crystals are grown using the Bridgeman method. Because this is an incongruent growth method, it was impossible ,up until now, to manufacture a large-sized, high quality BSO crystal at a high yield rate.
Oxide is a spin-off technology company of NIMS, (National Institute for Materials Science, of Japan), with a unique crystal growth technology based on continuous material feed. By applying this technology to BSO crystal growth, we have succeeded, for the first time in the industry, in commercial scale crystal production.
Through our production experiences in laser crystals, we have established a technology to rigidly control the growth conditions and chemical composition of crystals. As a result, our BSO crystals have an outstanding radiation hardness and a very uniform scintillation performance.

＜Processing＞

For the purpose of high energy calorimeters, scintillation crystals need to be very large in size, i.e., several hundred mm in length and several dozen mm in cross section. Hundreds or even thousands of such large crystals are mounted on a single calorimeter. Additionally, each crystal must be precision finished in order to have an individual shape and taper angle. Our X-ray diffraction technology enables accurate sensing of crystal orientation and we cut and polish scintillation crystals to meet the most rigid customer specifications.

＜Quality Control＞

Customer satisfaction is Oxide's No.1 priority. We have obtained ISO9001:2008 certification from ANAB (ANSI-ASQ National Accreditation Board) in the U.S.A., one of the most authoritative accreditation bodies in the world. At each production stage, we have complete process control so as to fully meet customer product specifications. To stay ahead of the pack, Oxide Corporation is always looking for new ways to improve our everyday quality control and customer service.

OXIDE offers single crystal solutions

Stoichiometric $LiTaO_3$

Check out our richly-experienced seasoned engineers.
Through a contract development, we will grow for you any new high-performance single crystals either for advanced industrial use or frontier research purpose.

Crystal growth unit of DCCZ
(Double-Crucible Czochralski) method

What crystal will you need?

- ✓ with novel performance
- ✓ with improved performance
- ✓ in material and shape not available in the market
- ✓ for evaluation of basic properties
- ✓ as substitute for existing materials

Contact us now !

Weak absorption measurement

Various crystal technologies to meet your needs

■**Growth methods**
DCCZ, CZ, TSSG, FZ, EFG, VB, etc.

■**Single crystals**
MgSLT/MgSLN, SLT/SLN, CLT/CLN, CLBO, BBO, LBO, KT, TeO_2, LGT, TGG, YVO_4, $GdVO_4$, BSO, BGO, and any other customized crystals

Versatile evaluation and analysis for quality control

■**Equipment / methods**
Photo-thermal interferrometer, Spectrophotometer, X-ray diffractometer,
Various laser sources, Prism coupling technique,
DTA (different thermal analysis), etc.

Devices & modules based on our crystals are also available.

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