Attempts to grow $\beta$-BaB$_2$O$_4$ ($\beta$-BBO) crystal fibers by the micro-pulling down technique. Characterization by Raman micro-spectroscopy

Michel Ferriol, Marianne Cochez, Queny Kieffer, Michel Aillerie, Alain Maillard, Patrice Bourson

To cite this version:
Michel Ferriol, Marianne Cochez, Queny Kieffer, Michel Aillerie, Alain Maillard, et al.. Attempts to grow $\beta$-BaB$_2$O$_4$ ($\beta$-BBO) crystal fibers by the micro-pulling down technique. Characterization by Raman micro-spectroscopy. XLIIIèmes Journées d’Etude des Équilibres entre Phases - 43rd Conference on Phase Equilibria, JL Tamarit, Mar 2017, Barcelone, Spain. hal-01484072

HAL Id: hal-01484072
https://hal.univ-lorraine.fr/hal-01484072
Submitted on 6 Mar 2017

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
Attempts to grow $\beta$-BaB$_2$O$_4$ ($\beta$-BBO) crystal fibers by the micro-pulling down technique. Characterization by Raman micro-spectroscopy

Michel Ferriol$^{1,2}$, Marianne Cochez$^{1,2}$, Queny Kieffer$^{1,2}$, Michel Aillerie$^{1,2}$, Alain Maillard$^{1,2}$ and Patrice Bourson$^{1,2}$

$^1$Université de Lorraine, LMOPS, EA 4423, 57070 Metz, France.
$^2$CentraleSupélec, LMOPS, 57070 Metz, France.

E-mail: email.address@nqbzbe.com

Barium metaborate ($\beta$-BaB$_2$O$_4$ or $\beta$-BBO) is known to be an excellent nonlinear optical material with a wide transmission range 190–3500 nm and a high damage threshold (10 GW.cm$^{-2}$). BaB$_2$O$_4$ has two modifications: the low temperature b phase and the high temperature a phase with a centrosymmetric crystal structure which has no utility in second order harmonic generation. In early works, the $\beta$-BaB$_2$O$_4$ crystals were grown below the a-b transition temperature (T~920°C) by using flux methods leading to crystals exhibiting more or less inclusions detrimental to their properties. More recently, the successful growth of high quality $\beta$-BaB$_2$O$_4$ without any flux from a supercooled BaB$_2$O$_4$ composition melt was reported [1-3].

The aim of this talk is to present the results presently obtained on the growth of $\beta$-BBO crystal fibers directly from the melt without any flux. To investigate their behaviour during pulling, the crystals obtained were thoroughly characterized by Raman micro-spectroscopy.

References