Refinement of parameters

Standard sample method

Standard Reference Materials 674a

CeO_2(Ceria) NIST SRM 674a
a=5.411102 Å (δ=0. 000097)

National Institute of Standards and Technology (NIST)

SRM674a ¥83,000
（α-Al_2O_3, ZnO, TiO_2 ,Cr_2O_3, **CeO_2** ）

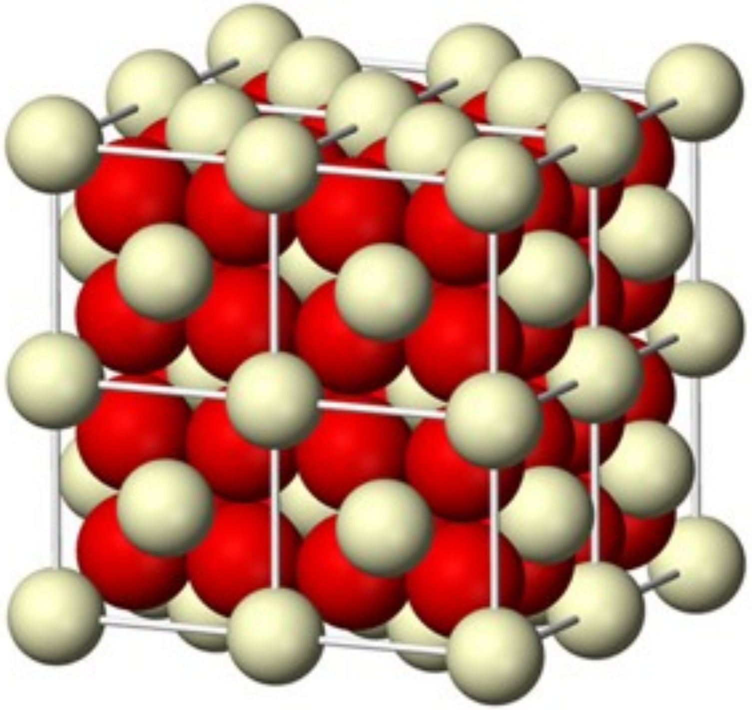
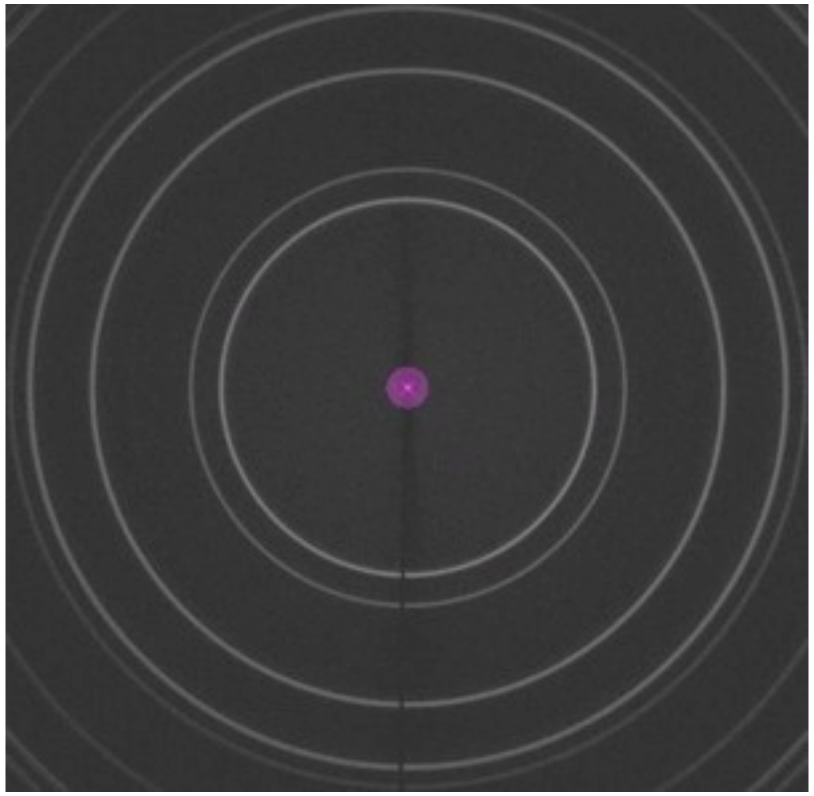


Fig. 1 Structure of CeO_2

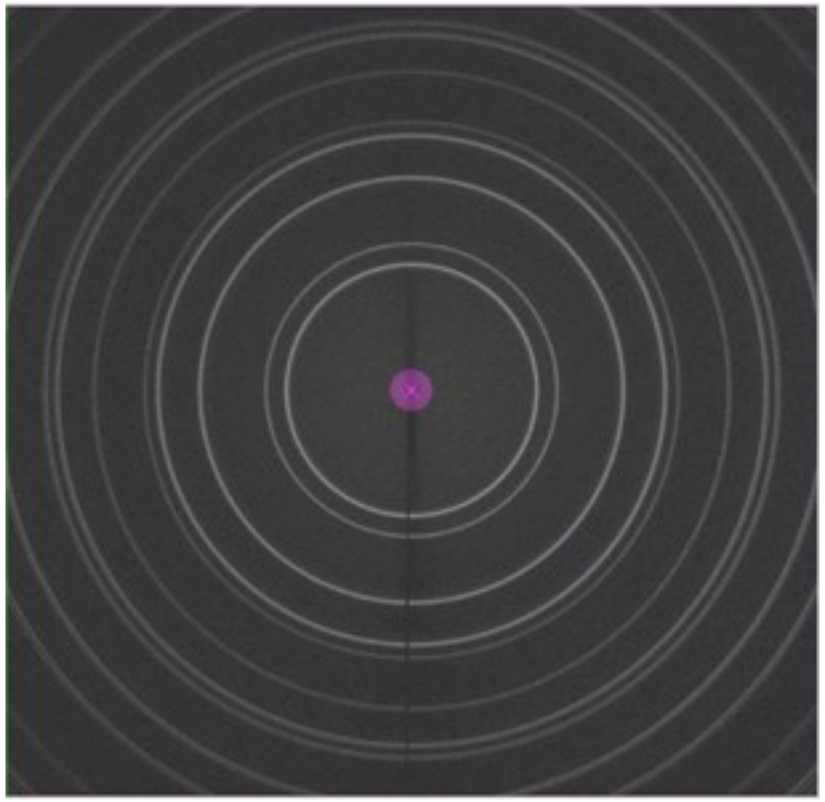
2010/08/10

CeO_2



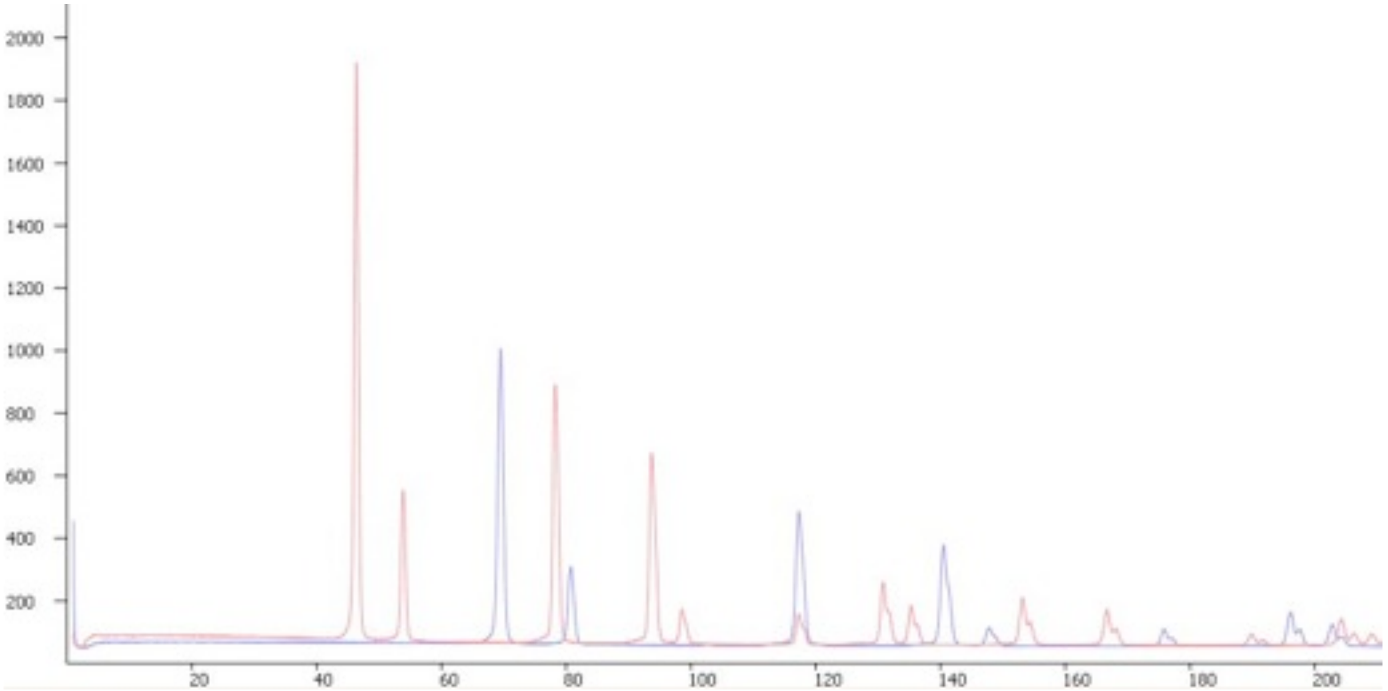
CeO01001

MgS=300 mm (3min)



CeO01002

MgS=200 mm (3min)

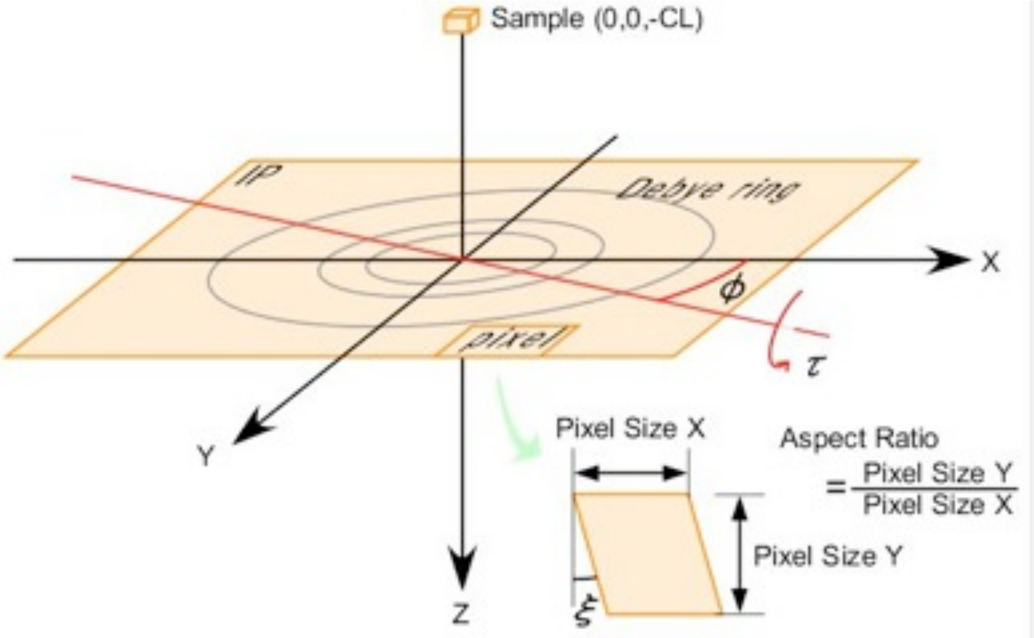


RIGAKU Micromax-007HF

rotating anode (**λ_{Mo}=0.7103 Å**, 5.3 kW/fine)

Imaging Plate Single Crystal X-ray Diffractometer

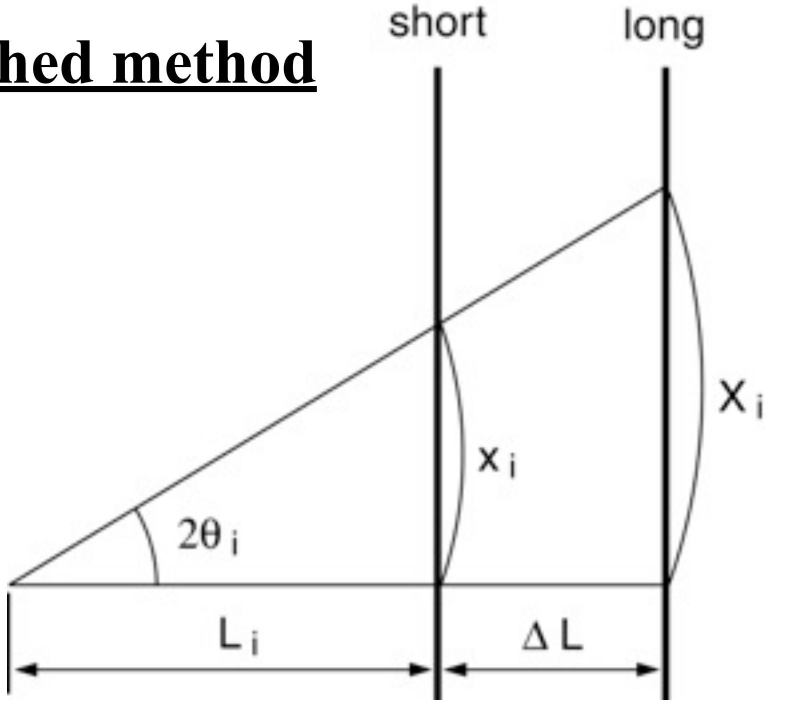
Imaging Plate: Rigaku R-AXIS IV^{++}



Rachinger Method

元素	$K\alpha$（平均値）	$K\alpha_1$(強い)	$K\alpha_2$(弱い)
Cr	2.29100A	2.28970A	2.293606A
Fe	1.937355A	1.936042A	1.939980A
Co	1. 790260A	1.788965A	1.792850A
Cu	1.541838A	1.540562A	1.544390A
Mo	0.710730A	0.709300A	0.713590A

Double Cathed method



A distance between IP (L)

$$L_i = (p_x \times x_i)/\tan 2\theta = (p_x \times x_i)/\tan 2(\sin^{-1}(\lambda/2d_i))$$

IP CALIBRATION TALBE

Table. 1: Refinement of all parameters (no peak decomposition) using Mo

Wave length (0.1nm)	Wave length (0.1nm)	Ceria (CeO_2)	IP distance (mm)	Camera Length (mm)	Pixel Size X (mm/pix)	Pixel Size Y (mm/pix)
08/10/11’-07/14/11’	**0.71073 (Kα)**	**5.411102**	**100**	300.57(2)	0.10056(7)	0.10027(7)

2010/08/10 CeO1001.stl:300
CeO1002.stl:200

Wave length (0.1nm)	Wave length (0.1nm)	Ceria (CeO_2)	IP distance (mm)	Camera Length (mm)	Pixel Size X (mm/pix)	Pixel Size Y (mm/pix)
02/10/11’-07/14/11’	**0.71073 (Kα)**	**5.411102**	**100**	300.534(0.019)	0.10065(6)	0.10033(7)

2011/02 CeO_2001.stl:300
CeO_2003.stl:200

Wave length (0.1nm)	Wave length (0.1nm)	Ceria (CeO_2)	IP distance (mm)	Camera Length (mm)	Pixel Size X (mm/pix)	Pixel Size Y (mm/pix)
07/14/11’-08/02/11’	**0.71073 (Kα)**	**5.411102**	**50**	299.668(0.022)	0.10068(3)	0.10037(5)

2011/07/14 CeO2001.stl (300)
CeO2002.stl (250)

	Wave length (0.1nm)	Ceria (CeO_2)	IP distance (mm)	Camera Length (mm)	Pixel Size X (mm/pix)	Pixel Size Y (mm/pix)
08/02/11’-	**0.71073 (Kα)**	**5.411102**	**50**	304.205(0.015)	0.10060(2)	0.10029(4)

2011/08/02 CeO2001.stl (300)
CeO2002.stl (250)

Table. 2: Refinement of all parameters (no peak decomposition) using PF

Wave length (0.1nm)	Wave length (0.1nm)	Ceria (CeO_2)	IP distance (mm)	Camera Length (mm)	Pixel Size X (mm/pix)	Pixel Size Y (mm/pix)
11/06/11’	**0.6150(2)**	**5.411102**	**45**	182.36(6)	0.09947(19)	0.09967(9)

2011/11/06 CeO2001.stl (50)
CeO2002.stl (5)

低温装置

X線ルミラー(東レ製)チェック