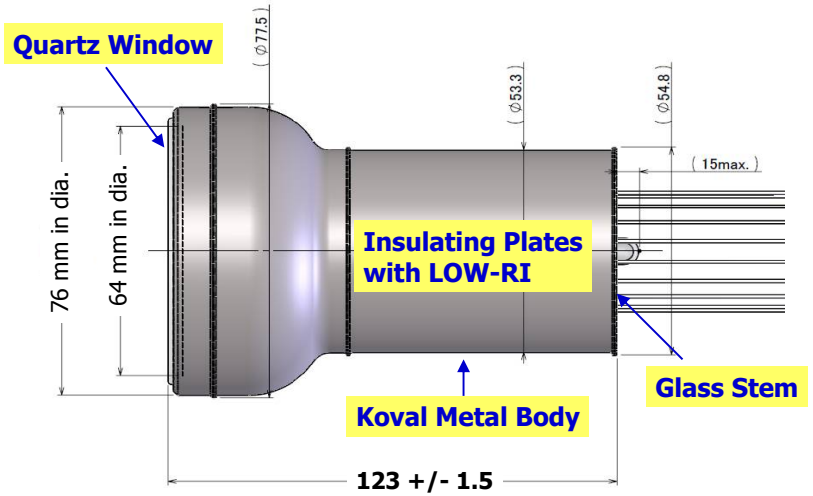
HAMAMATSU

Development of PMT (R11410MOD) for Dark Matter Experiment

Mar.23.2010

Hamamatsu Photonics

Development for R11410



RI Level for R11410

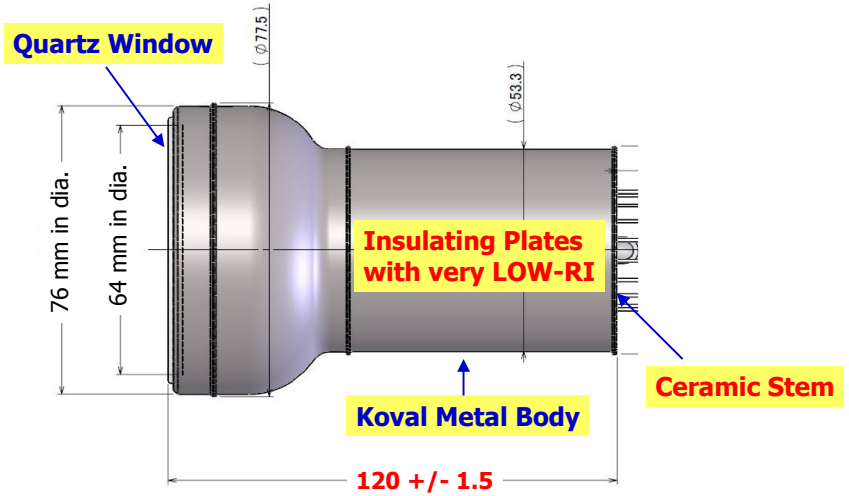
Estimated RI level

< Unit : mBq/PMT >

Materials	Weight (g)	40K	U	Th	Co60	Sub Total
Quartz Faceplate	35	0.0	0.4	0.8	0.1	1.3
Metal Bulb	115	25.0	0.0	9.0	2.5	36.5
Stem (glass)	14	4.0	5.0	2.0	0.0	11.0
Stem (metal)	7	8.0	0.0	1.0	0.0	9.0
Insulating Plates	16	5.0	10.0	2.5	0.0	17.5
Electrodes	31	0.0	0.1	0.0	0.0	0.1
Total	218	42.0	15.5	15.3	2.6	75.4

RI level of test data : 70~100 mBq/PMT

Development for R11410MOD



RI Level for R11410MOD

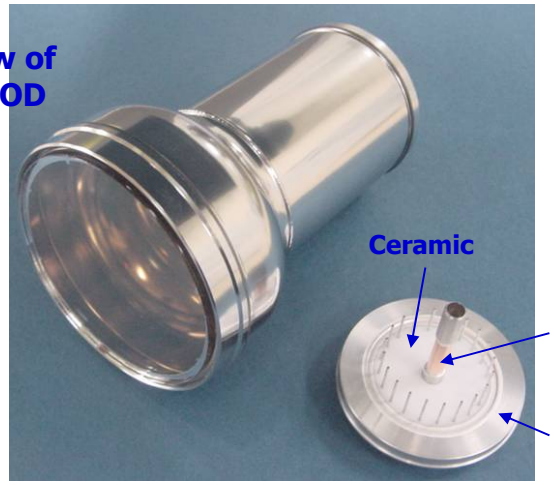
Estimated RI level

< Unit : mBq/PMT >

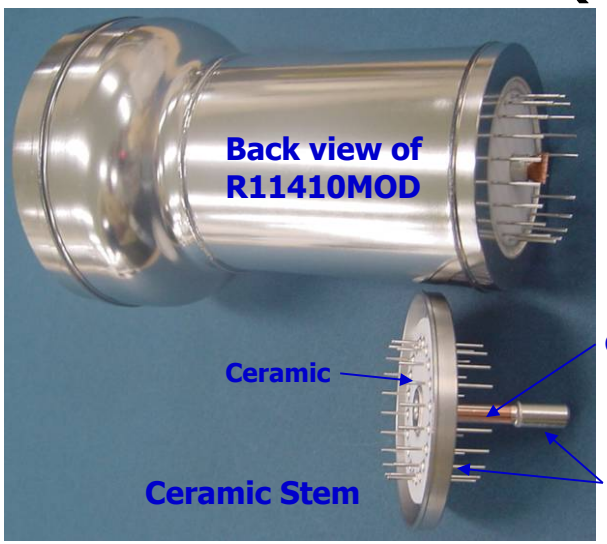
Materials	Weight (g)	40K	U	Th	Co60	Sub Total
Quartz Faceplate	35	0.0	0.2	0.4	0.1	0.7
Metal Bulb	95	5.7	2.9	1.0	3.5	13.1
Stem (ceramic)	25	0.0	0.0	0.7	5.5	6.2
Insulating Plates	16	0.0	0.1	0.2	0.0	0.3
Electrodes	31	0.0	0.1	0.0	0.0	0.1
Total	202	5.7	3.3	2.3	9.1	20.4

Expected RI level : 10~30 mBq/PMT

Picture of R11410MOD (1)



Picture of R11410MOD (2)



Comparison between 2 Types

Electrical Characteristics

Items	R11410	R11065
Suitable Experiment	**Liq. Xe**	**Liq. Ar**
Operating Temp.	**~ -110 deg C**	**~ -185 deg C**
Photocathode	Low Temp. Bialkali	Low Temp. Bialkali
Spectral response	160~650 nm	200~650 nm
QE at interest	**26% at 175 nm**	**25% at 420 nm**
Dynode Structure	Box & Line, 12-stage	
Gain	5E+06 typ. at 1500V	
Rise Time	5.5 ns typ.	
Transit Time	46 ns typ.	
TTS	6.5 ns typ.	
Pulse Linearity	20 mA typ. at +/- 2% dev.	

HAMAMATSU

Typical QE Curve