ˀ ᴇ Þ ₴ ↓

Ꮧ Ḩ ˆ ↓ ä ɵ ƞ و ɯ - ﻁ

Ꮧ Ḩ ˆ ↓ ä و ɯ - ﻁ

Ƽ Ⱬ ɩ Ɇ ɧ ɓ ȟ ȣ ɱ Ɏ ɔ ɩ ș Nj Ğ ʋ ǵ ʋ ˉ !

˙ Ǻ Ǥ ȓ Dz Ǟ Ğ ǵ ƽ

ᐱ ٻ Ḻ ʕ ݫ

ˀ ᴇ ₴ 3 ݢ

ů ► Ὼ ˩ ﻁ Ὼ

Ꝁ - ﻁ ᡒ Ɉ ᡒ ﻁ ﻅ ╡ ˌ

ꞔ ‹ ﻁ ⁄ǀ

عه

ǵ قح

ǵ ۑ ɵ ˙ Ǻ بي

ǵ ۑ

ǚ ȓ ȅ ǯ ǵ Ꮶ ῶ ǵ قح

UFB ǵ

UFB ǵ ʋ ǿ ǵ˝ ű

˙ Ǻ بي

_ Ψ

ᕕ قحب

► ǵ ˛

ڭ

ﮒ Ћ 6

ģ ق

ģ ې ө ˙ Á ي

ڭ - ط DzŎ ú Ŕ Ʉ Ʊ ù ì ģ Ǫ ū ř Ţ ˝ ↓ ä ˆ ģ Ă Ǩ Ư ° ʤ ģ Dz Ą

˝ Ă Ŕ ì ģ Ʒ lj Ŕ Y

ł ò Dz ‿ Ŕ ˝ Dz Ă Ŕ -

ồ Dz ‿ Ŕ ˝ Dz Ŏ ú Ŕ ↓ ä ي ģ ۱ Dz Ă Ŕ ù ģ ŭ ز ڈ ش ي

ך ɵ ō ɹ Ɇ ɵ ɲ ä Dz Ą ˝ Ă Ğ ˝ ģ ڈ ˙ ך

Ů ˆ DZ ʊ ˙ Á ∩ ề ř ģ ˙ ʣ

ů ģ Ʃ ä

ģ ې

ʊ ģ h ¨ H ₺ ş ‼ ¸ Ă Ŕ Ƨ Ẏ ģ ı Ʉ ɳ ģ ⌠ Dz ô Ŕ ʏ Ʒ lj Ŕ Ŭ Ư G ř ʒ B Dz

ä Dz ô Ŕ Ẇ î ıı ģ Ⱪ ä ì Ẏ ŭ DZ ı Ʒ DZ Ǫ ǫ NjŔ Y ¸ Ǐ ƿ Ư ģ ˎ Nj ģ Ẁ

î Ư Ẏ ĸ › ʊ ģ Ẁ Ư ب ي ج ģ Ẁ ä î ıı ģ Ⱪ ä Ŭ ̊ Ű Ř ř Ŕ Y ŭ ř Ř ä Dz ô Ŕ Ẇ

ä ş ¨ Ḥ Ă Ʒ ì ɬ Ǐ Ŕ ŭ ʒ Ŭ Ʒ ŭ ř ƿ Ư ʊ ģ ıı ₺ ص ₺ Ŭ ├ Ʒ ŭ Ư ¸ Ǐ ƿ

ģ ў ř ş л ф Dz Æ ā л ģ è è ي ج Ẇ ø ï Ă Ŕ DZ ǰ ɑ ₺ q ɹ ş g ɱ ɹ ģ ƽ Ẏ î ⁄ ˛

ʊ ģ ˬ Dz ¨ Ω ʦ Ʒ ŭ Ŕ Y

è Ğ Ư ف ڭ ˛ Ʉ ɮ z Ʒ ì ş ¨ Ï Njǫ Ẏ ʊ ş ص Ă Ŕ ת ص Ʒ lj ř Ư Ẏ ĸ › ʊ Ʉ ת

ص ģ β Δ ˜ Ṕ Dz Ţ H DZ ¨ Ω ʦ ş Ă ǫ NjŔ ʒ Ǐ Ř ř Ŕ Y Ă ŏ Ă DZ Ŭ Ř Ư Ẏ Dz Ʉ

ģ ù Ẏ Ŭ lj ř Ư Dz Ẏ Ŭ ř î Ă Nj ˛ ģ ص Dz Ʉ ˇ ģ ş ê ˛ Ğ

Ǩ ì ẉ ū lj Ŕ Y ŭ ģ Ẏ ģ ì ä ˛ ˝ Ʒ lj Ŕ ŭ ʒ Ŭ Ř ř ǫ NjŔ Ŭ Ư ŭ ř è Ʒ ►

Ʒ Ʉ Z ɪ Ɇ ɲ ɓ ɦ 8 ɱ Ɏ ɔ ɪ ° ʤ UFB ы Dz ô Ŕ ä ɬ Ψ ɲ ب Dz ô Ǫ ǫ Ẏ ş ɬ

Ǐ Ğ ˛ ş Ʒ ŭ Ŕ ŭ ʒ ş Ă ǫ ŭ Ğ Y ŭ ģ ä ɬ Ψ ɲ ب ş ô ř گ ɲ Dz Ă ŭ ʒ Ŭ Ʒ

ŭ ř ƿ Ư ù Ř DZ Ŕ ʊ ģ ˙ ʣ Ŭ è ř Ŕ Y

UFB Ʉ ي ج ۱ Dz ۴ Ă ى Ƶ DZ ɲ ب ş ˫ Ă Ŕ ʒ Û ř ǫ NjŔ Y Dz Ư UFB ş

NjŔ ŭ ʒ Ʒ غ ي ۱ ģ ¨ H ş ɲ ô ū ¸ ʤ ù Æ Ư ŭ ģ غ ي ş ʊ ۴ Dz ˝ Ă Ŕ ŭ ʒ

Dz ô Q ǫ Ĉ ģ ô Ă DZ ط ģ ɟ œ ȸ ş ش Ʒ ŭ Ŕ ° ך Ŭ lj Ŕ ŭ ʒ ş ŭ ř è Ʒ Dz ╗ Ʉ

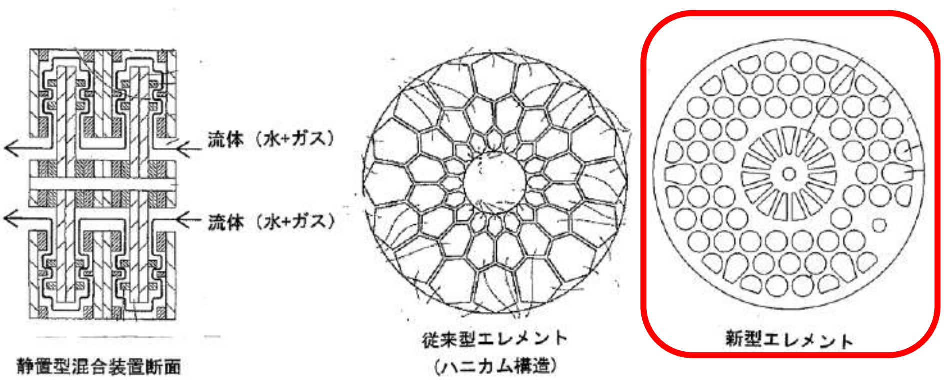
Ă ǫ ŭ Ğ Y

ǔ ȓ è ǯ ǵ　　K ǖ ǵ ق

UFB　　　ǵ

UFB　　　ǯ Ā ǭ Ƕ Ȧ Ⱥ ō Ł œ ȷ ɟ　ǵ ى Ƶ Ǳ ȷ ɟ Ǔ O ǫ ù ȓ ǭ ǋ Ȓ Ǔ Ʊ ô ȉ ḩ Ǳ Ɉ Ɽ ɪ ɗ ɩ ǵ UFB　　ǯ Ā ǭ Ʊ　ǵ ɛ ɱ ɞ ǯ A　ƅ ǵ Ḣ ş Ā Ȓ ɟ ȷ ę ɞ ǵ Ȧ ɪ ȶ ɱ Ɇ ş ʼ Ǫ Ğ　Ḍ　ȉ　ù ȓ ǭ ǋ Ȓ Ƴ　ǯ Ƕ UFB ǵ　Ǳ ǘ ǭ Ʊ ù Ȑ Ǳ　ō ȷ Ɇ ǯ　ҧ Ǳ　ǵ　ş　Ā Ʊ ȷ　ǵ　Ḍ　ş / Ā Ğ Ƴ

ȷ Ā ǖ　Ā Ğ ō ӯ œ Ƕ Ʊ ẉ ǵ Л Ḣ ş ρ Ĭ Ğ Ȧ ɪ ȶ ɱ Ɇ ş　Ê　Û Ǣ Ğ ȉ ǵ ǯ Ʊ ķ › Ǔ ǖ ǯ ǉ ȉ Ʊ　ō ȷ Ɇ ş ɨ Ĭ Ȓ ǔ ǯ Ǔ ǯ ǔ Ȓ Ƴ è Ğ Ʊ Л Ḣ ǯ Л Ḣ ǯ ş　Ā Ğ ǖ ǯ Ǳ ô ȉ Ʊ ȓ Ȑ ǵ　Ǳ　ù ȓ Ȓ　ǵ ȷ　Ǳ ô ȉ Ʊ ǯ　Ƕ ķ Ʊ Ǔ　ȉ　ù ȓ Ʊ ♫ Ʊ ǯ　Ā ǭ Ẏ ǔ Ǳ ǯ Ẁ ä Ǔ ķ Û Ȓ ǯ ǯ ȉ Ǳ Ʊ ǋ Ǣ Ṭ ȷ ǯ Ǔ/ Ā Ʊ　ǵ Ǔ ҧ　ô ǖ ḩ　ä ù ȓ ǭ ǋ ǖ　ǯ Ǳ Ǫ ǭ ǋ Ȓ Ƴ



Ḍ ō ӯ œ ق　ˡ

Ȧ ɪ ȶ ɱ Ɇ ǵ　ǋ UFB　　ǵ

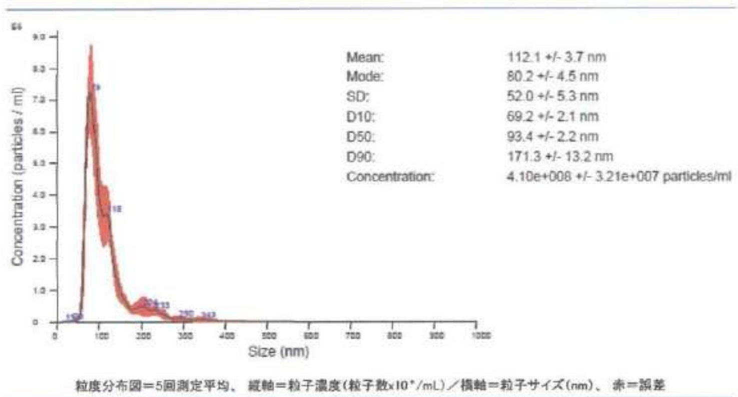
	(nm)	nm)	/ml
ķ	124.9 ± 12.4	80.9 ± 4.9	$1.83 \times 10^8 \pm 5.45 \times 10^6$
	112.1 ± 3.7	80.2 ± 4.5	$4.10 \times 10^8 \pm 3.21 \times 10^7$
β	174.8 ± 16.6	170.8 ± 20.9	$1.28 \times 10^8 \pm 8.86 \times 10^6$

β̀　ǵ ķ　ɟ UFB　　ǯ　Ā Ğ ȉ ǵ

è Ğ Ʊ̀　ǵ ķ　ȷ ɟ　Ɽ ȸ ɩ K ǯ ǯ　ǯ ş ķ　Ā Ȓ ȷ ɟ　Ǳ ô Ǫ ǭ Ā Ğ UFB ǯ　Ā ǭ ȉ Ʊ ȷ　ǵ Ȧ ɪ ȶ ɱ Ɇ ş　ǋ Ğ　Ḍ ō ӯ œ Ǳ Ƕ ↑ ˥ Ǔ ǉ Ȓ ǯ　Ĭ Ȑ ȓ Ȓ Ƴ

╗ ǯǶ ǰ ǵ Ḍ ȝ ȭ ȳ œ ş Ǟ Ğ UFB ǵ ɞ ƚ Ɇ Ł 8 ɞ ȝ Ɉ Ɏ ɔ ɩ UF-1 ş / Ǟ Ğ Y ǔ ǵ UFB ş Ǌ Ȓ ǯ Ʊ ♬ ǻ ǵ Ḍ ş Ǌ Ğ Ḭ ô ȑ ì Ʊ ♭ 100nm ↓ ǵ UFB ş Ʊ Â â 2 Ί ǵ ↓ ǯ ǯ ǔ Ȓ ǔ ǯ Ʊ Ȓ ǒ ǯ Ǆ Ǫ Ğ ► Y Ǆ Ǒ Ʊ ǰ ǵ Ḍ ǅ ǫ Ǌ ǭ Ƕ ş ï Ǟ ǭ Ǌ Ȓ 2020-163241 Y

ȝ Ɉ Ɏ ɔ ɩ UF-1 Ẇ



ȝ Ɉ Ɏ ɔ ɩ UF-1 ǯ Ǟ Ğ UFB ǵ ↓ ǹ 9

Ⱥ ♭ 112nm ↓ 4.1 ¥ 10^8 ΄H/ml

UFB ǵ ʋ ǿ ǵ˝ ű

╗ ҤƲ ǚ ȓ ѐ ǯ Ç ›ط ⁄l ǯ ǵ Bˉ ș ǋƲ ﮐ UFB ǲ ô Ǫ ǭ

Ā Ğ UFB ǲ ô ȉ Ā Ğغي ǵ ʋ ǿ ǵ˝ ș ىب Ā ǭ ŭ Ğ Ƴ ǥ ǵ بƲ

ˎ ǵ ǲ Ǒ ǋ ǭ Ʋ ˎ ǵ ↓ ǵ˰ ʤ î ʥ ! Ẏ ȕ ǵ˰ ǵ ђب Ŭ Ȉ Ȓ

ȓ Ğ Ƴ ѐ Ğ Ʋ ङ ę ɱبحي ǵ ɓحي ۴ ǲ UFB ș ˈ ŭ ê ǚ ǯ ǯ Ʋ ǵ Ẁ ä Ǚ ɨ Ĭ Ȓ ȓ Ʋ

ıı Ŭ ѐ Ȕ î ŏ ǲǱ Ȓ ǚ ǯ ȉ ȕ ȓ Ğ Ƴ Ā ŏ Ā Ʋ ǚ ȓ Ȓ Ҥ ǉ ǖ ѐ ǯ ȉ ǵ ǯ ǉ Ǫ

ǭ Ʋ ˈ ǵ ɟ ę ɟ ȸ ɞ Ҥ ڱ Ȓ ŏ ǲǱ Ǫ ǭ ǋǱ ŏ Ǫ Ğ Ƴ

˙ Ấ بي

ﮐ ǵ " Ǳ ҤƲ ╗ Ŭ ǚ ȓ ѐ ǯ ḧ Ǫ ǭ ŭ Ğ UFB ˊ Ʋ ǲʣمحي ˥ Ő ȷ ș ǋ Ğ

UFB ы ǲ ô Ȓ ʋ ǵ ä ɨ Ψ ș Ձجي Ā Ʋ ıı ᵼ Ŭ ├ ȕ ȓ Ğ ʋ ș Ā Ȓ ǚ ǯ ǲ

ǉ Ȓ Ƴ ǥ ǵ Ğ Ȉ Ʋ ♫ ـ Ҥ غي ǵ ɒ ɣ Ƞ ǯ ǵ Ŭ " ǯ ǉ Ǫ Ğ UFB ы ǲ ǫ ǋ ǭ Ʋ ű

ǵ ʋ ǲ Ǒ ǋ ǭ' ȕ ȓ Ȓ ô Ă Ǳ سم ǯ ǰ ǵ ô Ă Ǳ̉ Ӽ ș Ā ŏ ș ىب Ā Ʋ ʋ ǿ

ǵ ' ș ᴸ Ȓ Ğ Ȉ ǵ ű ș Ă Ƴ ѐ Ğ Ʋ مم ﻹ ɟ œ ę œ ǯ ǉ Ȓ ╗ ǵ ș محي ŏ Ā ǭ Ʋ

ʋ طǲ ǯ ŭ Ȓ ô Ă Ǳ UFB ρ ș / Ā Ȓ Ƴ

ǥ ǵ̀ ǲ Ʋ ä ɨ Ψ ǲ Ȓ ā ʋ ɕ ɧ ɱ Ɇ ǵ ﷲ ǿ ǵ˝ Ʋ UFB ǵ ʞ ș ŏ Ā

Ğ ʋ ǵ ʋ ˊ ǲ ǫ ǋ ǭ ȉ ىب Ā Ȓ Ƴ

ǥ ǵ Ğ Ȉ Ʋ ﮐ - ط ǯ Ҥ ► ʌ˚ ʤ ǵ ô Ă Ǳ ǯ بي ș ʋ̇ Ā Ğ Ƴ

UFB ǵ ˥ ǯ ђب ǵ

1-1 ˭ ˵ ǯ ˥ ǵ ‿ ǵ ىب

100 500nm ↓ ǵ ǀ ǵ̂ ˜ ǵ ƅ ǵ UFB ș ȕ Ǣ Ȓ ǚ ǯ Ŭ ǯ ŭ Ȓ ˭ ˵

ǲ ǫ ǋ ǭ ىب Ā Ȓ Ƴ

UFB ǵ ˥ ǯ ʋ ǵ ä ɨ Ψ ђب ǵ ‿ ǵ ىب

ǲ ô Ǫ ǭ ♬ Ȓ ȓ Ğ UFB غي ǵ ʋ ǲ̎ Ą Ā Ȓ ђب ș Ā Ʋ UFB ǵ ˥ ǯ ђب ǯ

ǵ ‿ ș ڱ Ȓ ŏ ǲ Ā Ȓ Ƴ

ô ȉ ђب Ǳ UFB ǵ ˥ ǲ ǫ ǋ ǭ ǵ ىب

ﮐ ǵ ș ȉ Ǫ ǭ Ʋ Ḩ Ʌ œ Ł ș ♬ Ȓ Ƴ

ʋ ǯ ǵ UFB محي ǵ ű

Ẏ ʞ › ʋ ǲ Ǒ ű Ȓ ű

ɏ ʔ ő Ԋ ȉ ę ʔ Ɇ ǵ تمي ᵼ ș ♥ ف ŏ Ȓ ȷ ˚ ʣǲ ├ Ā Ȓ Ƴ

ǁ Ǔ ǘ Ê î Āǋ ˎ ʋ ș ʋ ä Ā Ȓ Ƴ

ʼŬ ķ › ʋ ǵ ä ș ɨ Ψ Ā 20 ˚ ʣ ǁ ș ├ Ā Ȓ Ƴ

ʼŬ ǵ Π Dž Ā Ʊ è ȑ ș 2 ˚ ʣ ʣ ù Ǣ Ȓ Ƴ

ǹ DzǑ ǘ Ȓ ű

ɔ ɨ ǵ ǋ ǵ Ẁ ș ɨ Ĭ Ʊ ș ♥ ŏ Ȑ ʣDz ├ Ā Ȓ Ƴ

3 ʋ Ʊ ǹ DzǑ ǘ Ȓ ű

ʣ Ʊ ˚ Ẇ ǵ ʋ ȅ ĞĦ DzǫǋǭǕ ș Ă Ƴ

ʋ ǹ DzǑ ǘ Ȓ ű

ǹ ɵ ʋ ǹ Ʊ ə ̏Ḫ Ʊ ä Ĭ Ʊ ä ʋ ǹ DZ ǰ ȝ ĞDZ - ʼ ǵ˚ ˥ ǉ Ȓ ǹ Dz

ǭ ̏ḪDZ ǖ ǯ ȉ ȷ ǫ˚ ʣ ǵ ǹ ǯ ű ș Ă Ƴ

ʋ ¯ ! Dz Ā Ğ UFB ǵ

Ƶ DZ ʋ ķ › Dz ʆ DZ UFB ǵ ǯ /

ȵ UFB ș ɗ Л˚ ʤ ǵ ˛ ɛ ǯ ʣ ⁸ ǯ ŭ Ȓ ô Ă Dz Ā Ȓ Ƴ

ʼ ʤʼ ɟ œ ȸ Dz ǪĞ ʋ ǹ ǵ UFB ș Ê Ţ ğ ṇ ș /

Ā ʣ ⁸ Ā Ȓ Ƴ

ʋ ǹ Dz ʆ DZ UFB ǵ ǯ /

ȝ ĞDZ - ʼ ǵ˚ ˥ ǉ Ȓ ǹ ǯ ǵ UFB ș Ê Ţ ğ ṇ ǵ /

Dz ǫ ǋ ǭ Ā Ȓ Ƴ

Ψ

Ų ɉ Ç ɯ ɸ ɱ Ł œ

ű ž

ɝ Ǝ ɝ ╛

Ç › ʌ ǯ ǹ ʋ

Ƞ ȼ Ɏ Ȣ ʅ œ

ʌ ʣ ₐ Ȣ Ɍ ɗ œ ŋ ɥ ɱ ō œ Λ ȡ ɋ œ Ł Ĕ ʳ ʳ ӵ

╛ Ç Ʉ ȡ œ Ȧ ɩ Ę œ ˊ ☻ ɵ - ȝ ˝

Ώ ╛ ɥ ʣ

╛ Ŏ ǯ Ă Ǽ › ʌ ǋ Ā ŏ Û ¨ ˊ ☻ ʼ ..

╛ ₡ ɥˊ ☻ ᵁ

ᕕ قح ب

UFB ģ ˥ ǯ ƞ ب ģ

1-1 ˷ ̏ ǯ ˥ ģ ‿ ģ ى

ˆ ̎ ģ ҍ ģ UFB ș ǜ ǢȒ ˷ ̏ ȅ Ǯ ș ï Ǡ ǚ ʒ Ⱶ Ǯ ǚ DZ ǒ Ǫ Ğ Ǔ Ʊ ƞ ô ǖ

UFB ș ǜ ǢȒ ǚ ʒ Ǔ Ǯ ǚ Ȓ ʒ ʆ DZ ˷ ̏ ș Ǡ Ȓ ǚ ʒ Ǔ Ǯ ǚ Ğ Ƴ

ȅ Ğ Ʊ ى Ƶ DZ ʥ ǯ ģ UFB ģ ő ỏ ˥ DZ ǫ Nj ǭ ì Ǡ Ȓ ǚ ʒ Ǔ Ǯ ǚ Ğ Ƴ

UFB ģ ˥ ǯ ʋ ģ ä ɨ Ψ ƞ ب ģ ‿ ģ ى

ô ȓ ƞ ب DZ UFB ģ ˥ DZ ǫ Nj ǭ ģ ى

Ẏ ځ ǿ ģ ƞ ب Ʊ UFB ģ Ẏ Ƚ ɱ Ȳ ȭ ǿ ģ ƞ ب Ʊ ģ Ꝃ ä DZ Ǡ Ȓ ǿ

ģ ƞ ب Ʊ ǿ ģ ƞ ب ș Ǡ Ʊ ʋ ́ ǿ ģ ș ♬ Ȓ ǚ ʒ Ǔ Ǯ ǚ Ğ Ƴ

ʋ Ǯ ģ UFB ģ ǘ

Ẏ ĸ › ʋ DZ Ǒ ǘ Ȓ ǘ

Ȳ ʔ ȭ Ⱨ ȓ ę ʔ Ʉ ģ ǃ ģ ├ ș Ǎ ǚ ʒ Ⱶ Ǯ ǚ DZ ǒ Ǫ Ğ Ƴ

ıı Ǔ ǖ Ȇ î Ǡ Nj ˎ ʋ ģ / ǯ ȳ ɱ ɞ ι ⌊ œ ȭ Ⱶ Ǎ ǚ ʒ Ǔ Ǯ ǚ Ğ Ǔ Ʊ ʋ

ä DZ Ⱶ Ȑ DZ ǒ Ǫ Ğ Ƴ DZ Ǒ Ʊ ǚ ģ ˎ ģ ǖ DZ ǫ Nj ǭ ȷ ș ï Ǡ Ğ PCT

JP2021 006853 Ƽ ˎ ģ ǖ Ƽ Ƴ

’ Ǚ ĸ › ʋ ģ ä ɨ Ψ DZ ǫ Nj ǭ Ʊ ’ Ǚ ģ UFB ы ȅ ǯ ى ǯ ǚ DZ ǒ Ǫ Ğ ģ ǯ Ʊ

ıı ǃ ģ ├ DZ Ⱶ Ȑ DZ ǒ Ǫ Ğ Ƴ

’ Ǚ ˛ ģ Π ǿ ģ ́ DZ ǫ Nj ǭ Ʊ ǘ Ǡ Ȓ Ğ Ȉ ģ Π ģ ș Ǫ Ğ Ǔ Ʊ

ȅ ȓ ˙ ʣ ģ ǘ DZ Ⱶ Ȑ DZ ǒ Ǫ Ğ Ƴ

Ǥ ģ ̀ Ʊ Ẏ Ƚ ɱ Ȳ ȭ ʋ Ẏ ঔ œ Ʉ ǿ ģ ́ DZ ǫ Nj ǭ ى Ǡ Ʊ Ẏ ǜ ģ DZ Nj

/ ʋ ș ♬ Ȓ ǚ ʒ Ǔ Ǯ ǚ Ğ Ƴ ǚ ģ Ẏ Ğ Ţ Ǹ ǖ ʋ ģ DZ ǫ Nj ǭ Ⱶ Ʊ ș ï Ǡ

Ğ 2022 - Ƽ ى ĸ › ʋ ģ ǖ Ƽ Ƴ

ǹ DZ Ǒ ǘ Ȓ ǘ

ɔ ɨ ģ ˎ Nj ģ Ẁ ș ɨ Ǐ Ȓ DZ ǰ Ʊ ̀ ģ ä ɨ Ψ DZ ô Ȓ ǃ ģ ├ Ⱶ ǘ Ǡ

Ȓ ǚ ʒ Ǔ Ǯ ǚ DZ ǒ Ǫ Ğ Ƴ

3 ʋ Ʊ ځ ǹ DZ Ǒ ǘ Ȓ ǘ

ę ʔ Ʉ ģ ↓ʰ ˘ DZ UFB Ǔ ƞ ǯ ǉ Ȓ ǚ ʒ ș ï Ǡ Ʊ ș ï Ǡ Ğ

2021 - 26969 Ƽ ̎ Ⱶ ب ǘ ģ Ẁ ɨ Ψ ǖ Ƽ Ƴ

ʥ ˥ Ǒ ȷ UFB DZ ô Ǫ ǭ ģ ıı ǃ ģ ├ ș ᴸ Ȓ ǚ ʒ Ǔ Ǯ ǚ Ȓ ǚ ʒ ș ï Ǡ Ʊ

Ǥ ǵ ы ǯ ы Ā Ğ ǅ Ā Ȓ ş ï Ā Ğ 2021 -26968 ƽ

ǵ ä ǒ ƽƱ 2022 - ƽ Ǻ Ǥ ǵ ǒ ƽ Ƴ

ǅ ǫ ǋ ǭ ȉ Ʊ UFB ы Ŭ ıı ǵ ǅ ǯ ǉ Ȓ ű ǯ ş Ā Ğ Ƴ

ʋ ǹ ǅ Ŏ ű Ȓ ű

ä ʋ ǹ ǯ ǵ ʋ ǵ ķ ǀ ǳ ǵ Ğ ȉ ǅ UFB Ŭ ǯ ǉ Ȓ ű ǯ ş ű Ā Ȓ

ű ǯ Ŭ ǯ ŭ Ğ Ƴ

Ǥ ǵ Ʊ ǒ ɱ ǭ ɨ œ Ɇ ǵ ǅ ǫ ǋ ǭ ȉ ǵ ˥ ş Ā Ğ Ƴ

ʋ ! ǅ Ā Ğ UFB ǵ

Ƶ Ǆ ʋ ķ › ǅ Ƨ Ǆ UFB ǵ ǯ /

ʋ ǹ ǅ Ƨ Ǆ UFB ǵ ǯ /

ȡ Л ↓ ǵ ǯ ǳ ǯ ŭ Ȓ Ḍ UFB ş Ā Ȓ ű ǯ Ŭ ǯ ŭ Ğ Ƴ

Ǥ ǵ Ʊ ǳ ǅ è ǯ Ȑ ǅ ŏ Ǫ Ğ Ŭ Ʊ ş Ā Ȓ ǵ ǅ ǯ ŭ

Ȓ Ψ Ᵽ Ʊ UFB ы Ŏ ô Ǻ UFB ş Ā Ğ ' Ű Π

ş / Ā Ȓ ű ǯ Ŭ ǯ ŭ Ğ Ƴ

► ǵ

Ƴ Ƴ

ǂ 510 -0025 3-18 059 -331 -2158

E-mail ito@minamisangyo.com

ݣ

UFB ǵ ˥ ǯ ҧ ب ǵ

ˌ ̏ ǯ ˥ ǵ ‿ ǵ ى

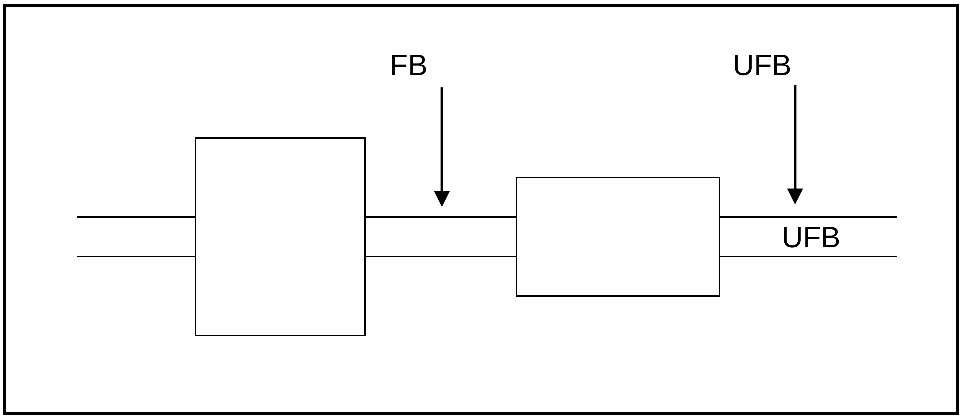
ы ᶿ ȝ ǯ UFB ǵ ‿

ݣ ǯ' ǞĞ ﻟﺴﺮ Ḍ UFB ࣋ Ɉ Ƴ ɔ ɩ ǵ ڡ ҸƱ ˪ 1Ě ǲ

Ǟ ǯ Ŏ ȓ Ʊ ἀ ﻐﻴ ǲȪ ȷ ș ˈ ŭ Ê Ʊ ᨎ ɛ ɱ ɞ ǯ ȕ ǢĞ ♭ ǵ Ẏ ŭ ǋ

ɓ ȟ ȣ ɱ Ƴ ɔ ɩ ș Ʊ Ḍ ࣋ ȭ ȳ œ ș ȕ ǢȒ ȗ ǯ ǯ ȕ ȑ ǲǢ Ț ̈ ȝ ș ĸ Ĭ ḩ ä

Ǟ ǭ ǋ ȕ ڡ ǯ ǉ Ȓ Ɏ



˪ Ě ݣ ǲ " ǲ' ǞĞ ࣋ Ɉ Ƴ ɔ ɩ UF-1 ǵ ڡ ﭪ ˪

ȗ ǵ ڡ ǒ ȑ Ʊ ﻐﻴ ǵ ї ˛ ζ ș Ƴ ɩ ɔ ǯ Ǫ ǭ ࣋ ȭ ȳ œǲ ᶿ ȝ ș ǒ ǘ Ȓ ȗ ǯ ǯ ô ȓ ḩ

ǯ ↓ ǵ UFB ﻐﻴ Ǔ ♬ ȑ ȓ Ȓ ȗ ǯ Ụ̌ ủ ȕ ȓ Ğ Ɏ Ǥ ǵ Ğ Ȉ Ʊ ї ˛ ζ ǲ Ƴ ɩ ɔ ș

Ǟ ǭ ᶿ ȝ ș ǒ ǘ ǭ UFB ﻐﻴ ș Ǟ Ʊ ↓ ǯ Ή ﺭ Ώ ↓ ș Ɉ Ɍ Ƀ ɧ ʔ ȭ ɱ Ȯ ڗ ˩ Ɉ Ɍ

ῃ ﺀ Ƽ Ɉ Ɍ ȳ ȣ Ƀ NS300 ƽ ˪ ș ǋ ǭ ủ ǞĞ Ɏ 60 ѝ Ǟ ǭ

ǞĞ ♥ ǵ ﻐﻴ ﻐﻴ ǵ ủ ب ș ǲ Ǟ Ɏ

ꜙ ɟR ῆ ﯨ ɟRӯ8Ɇ NS300

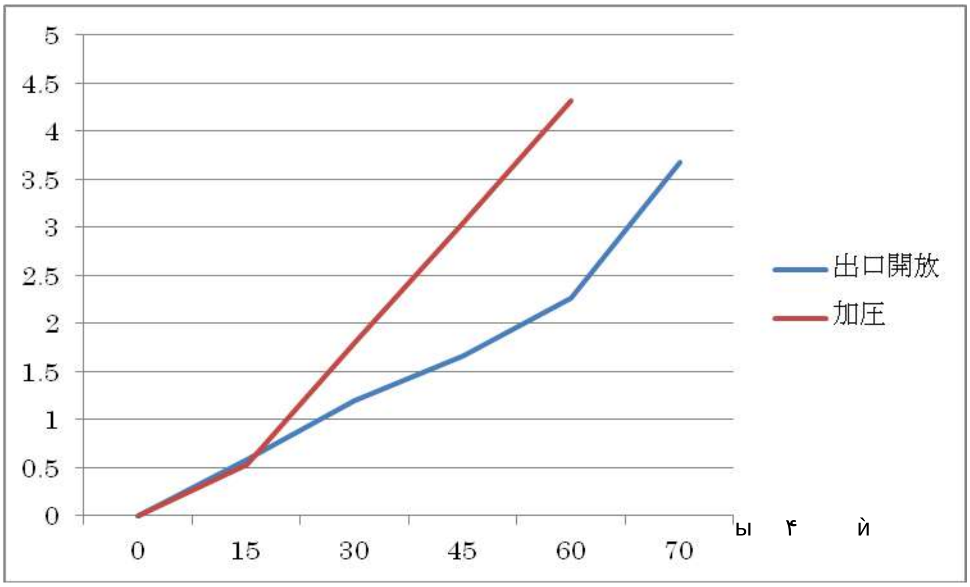
ы ᶿȝǯ UFB ǵ ‿

	Pa)	(	nm)	(nm)	ﱞ
	0	60	87.4	55.1	2.26E+08
( )	37	60	86.2	62	4.32E+08

Ⱶӯɱɞɩǵ΄ˏ῟↓ŏȒы ǑǵɢﻐǵΉˏ῟↓ş ǟǭ ïǞĞϒ

èĞƱǚǵǚ ǄŎǘȒ UFB ǵ ﻴ Ẁäşꜙ Ǆ ǞĞϒ

¥10⁸ 個/ml



ꜙ Ȧɪɉɱ ɆǄĸᶿǞȒǚǯǄôȒ UFB ǵ◙

ǄŎƱƼ ï¸ ˛ƽǵ 60 ѝ♥ⱵƱ ï¸ ᶿȝǓĸᶿǵĪ˛ ǯˉ ǟǄ

ǄȒôǍǄϒɩɔş Ǟǭ 70 ѝèǯ ǞĞ

ǚ ǵ ﺐ ô ȓ Ʊ ঌ ō ȳ œ Ǳ ĸ ᶿ Ā Ȓ ǚ ǯ Ǯ ҧ ô ū UFB ș ǜ Ǣ Ȓ ǚ ǯ Ǔ ѝ ŏ Ǫ Ğ Ɏ ᴸ ǲ Ǒ Ǌ ǭ Ʊ 60 ѝ˚ ï ˛ ᶿ ʓ Ǔ̄ ǟ ǲ Ǳ Ȓ ô Ă ǲ ★ Ā Ȓ ǚ ǯ Ǯ Ȯ ŋ ɓ ǵ ï ǔ Ǔ ĸ ᶿ ǵ Ī ˎ ǯ̄ ǲ Ǳ Ǫ Ğ ǵ Ǯ Ʊ ʓ Ҥ ï ˛ ᶿ ʓ ǲ ﺧﻲ Ā Ȓ ȉ ǵ ǯ Ĭ Ȑ ȓ Ȓ Ɏ ǚ ȓ Ȑ ﺐ ŏ Ȑ Ʊ ˹ ♥ ǵ Ǯ Ҥ Ʊ " ǲ ǚ ǵ ˽ ǯ̆ ǜ Ǣ Ğ UFB ǲ ǫ Ǌ ǭ ﺑﻰ ș Ă ǚ ǯ ǯ Ā Ğ Ɏ Ǳ Ǒ Ʊ ǚ ǵ ű ǵ ˽ ˚ ʣ ǲ ï ˛ Ɏ ɩ ɔ ș Ȓ ǯ Ʊ ɛ ɱ ɞ Ǔ ǯ Ǳ Ǫ ǭ ɑ ﻣﮫ Ā Ȓ Ɏ

► ʌ ǵ Ǯ Ҥ ₳ 500nm ↓ ǵ ɓ ǵ UFB ȉ ǜ Ǣ Ȓ ǚ ǯ ș ȕ Ā ǭ Ǌ Ğ Ǔ Ʊ ˽ ș Ẁ ä ǜ Ǣ ǭ ȉ ₳ ɓ Ҥ 100nm Ǖ ♥ Ǳ Ǳ Ǫ Ğ Ɏ Ẏ ǔ ū ɓ Ǔ Ǳ Ȓ ﻣﻄﺤﻢ ș ♬ Ȓ Ǳ Ҥ Ʊ ʍ ǵ ɟ ę ɉ ȸ ɞ ș ﺑﻰ Ā Ȓ ɯ Ǔ ǉ Ȓ Ɏ

Ȧ ɪ ɟ ɱ Ɇ ǵ ◖ ǯ UFB ǵ ‿

╗ Ǯ Ҥ Ʊ ♬ ̠́ ǵ ɍ ɉ ę ɞ ﺻ A ǵ Ȧ ɪ ɟ ɱ Ɇ ș Ǌ Ğ Ḍ ঌ ō ȳ œ ˚ ʤ ♬ ̠́ Ḍ ঌ ō ȳ œ ǯ ڗ ◖ ʸ ǵ Ȧ ɪ ɟ ɱ Ɇ ș Ǌ Ğ Ḍ ঌ ō ȳ œ ˚ ʤ ڗ ◖ ঌ ō ȳ œ ǯ Ǯ Ҥ Ʊ ڗ ◖ ঌ ō ȳ œ Ǔ ô ȓ ҧ ǲ UFB ș ǜ Ǣ Ȓ ǚ ǯ ș Ā ǭ Ǌ Ȓ Ɏ

ﺜﻠ ـ ﻃﺢ ǲ ô ȓ Ɉ R ῃ ɩ ș ‶ Ḫ Ҍ Ā Ğ ǚ ǯ Ǯ Ǳ ﺑﻰ Ǔ˚ ǯ Ǳ Ǫ Ğ Ɏ̿ Ǣ ǭ’ Ā Ȓ Ő ȷ ș’ ǵ ﯾﯿ ǲ ô Ȓ ◙ ȉ ﺑﻰ Ā Ȓ ǚ ǯ ǯ Ā Ğ Ɏ ȅ Ğ Ʊ ы Ā Ğ ﻐﻲ ǵ ʺH ↓ ǵ Ẁ ä î ʺH ǵ ̈ ҧ ǯ UFB ǯ ǵ ‿ ǲ ǫ Ǌ ǭ ȉ ﺑﻰ Ā Ğ Ɏ

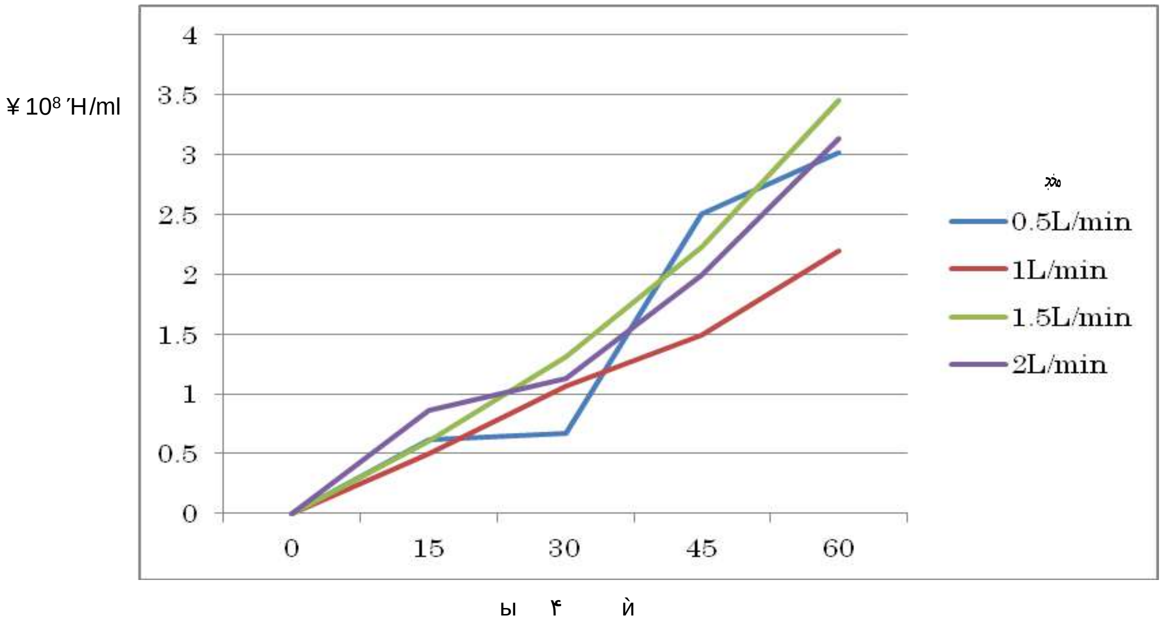
♬ ̠́ Ḍ ঌ ō ȳ œ ǵ ʓ ș ǲ Ʊ ڗ ◖ ঌ ō ȳ œ ǵ ʓ ș ǲ Ǥ ȓ ǥ ȓ Ā Ɏ ȅ Ğ Ʊ ǚ ȓ Ȑ ǵ ♬ ̠́ Ḍ ঌ ō ȳ œ ǵ ۴ ǲ˛ Ă UFB Ẁ ä ș ᴸ ǲ Ʊ ʺH ↓ Ẁ ä ș ᴸ ǲ Ʊ ȅ Ğ ڗ ◖ ঌ ō ȳ œ ǵ UFB Ẁ ä ș ᴸ ǲ Ʊ ʺH ↓ Ẁ ä ș ᴸ ǲ Ʊ Ǥ ȓ ǥ ȓ Ȯ ŋ ɓ ä Ā Ğ Ɏ

♫ ̲̂ Ḍ ঌ ȭ ȳ œ ǵ Ʒ

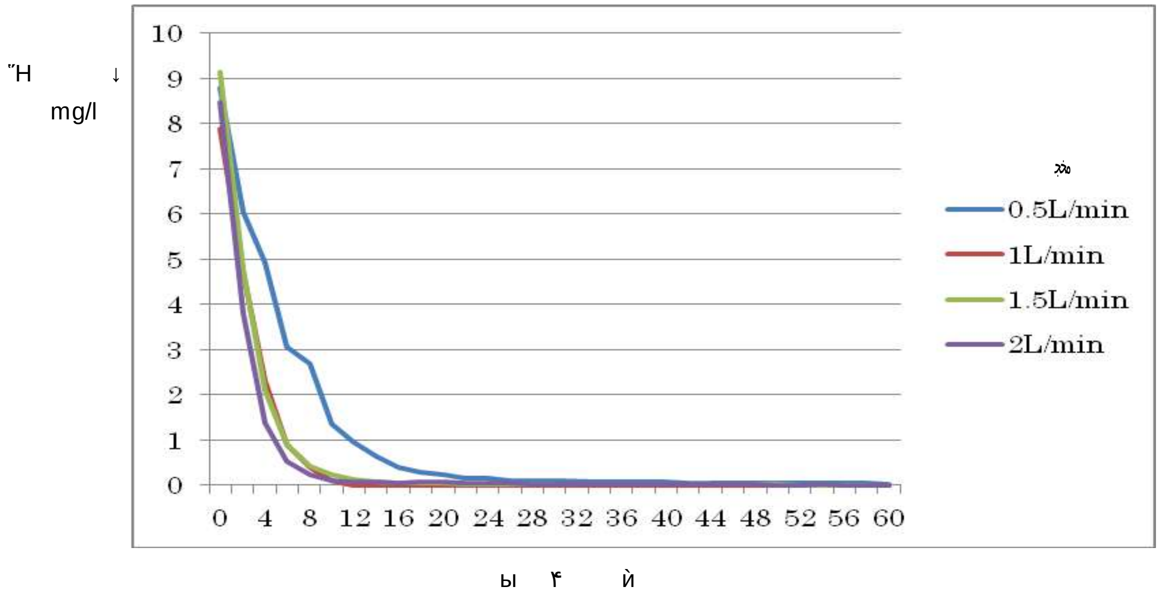
L/	(	(nm)	UFB (خ /	(mg/L
0.5	15	115.6	6.21 10^7	0.52
	30	118.8	6.7 10^7	0.10
	45	95.5	2.51 10^8	0.05
	60	65.1	3.02 10^8	0.03
1	15	123.8	4.96 10^7	0.00
	30	114.9	1.06 10^8	0.00
	45	112.6	2.06 10^8	0.00
	60	102.2	2.77 10^8	0.00
1.5	15	99.3	6.06 10^7	0.06
	30	93.1	1.31 10^8	0.02
	45	87.5	2.23 10^8	0.01
	60	86.8	3.45 10^8	0.00
2	15	94.7	5.63 10^7	0.06
	30	100.8	1.11 10^8	0.01
	45	95.5	1.99 10^8	0.02
	60	89.4	3.14 10^8	0.00

ڗ ◖ ঌ ȭ ȳ œ ǵ Ʒ

L/	(	(nm)	UFB (خ /	(mg/L
0.5	15	106.7	1.90 10^7	0.69
	30	98.6	1.13 10^8	0.34
	45	90.3	1.96 10^8	0.33
	60	87.4	3.32 10^8	0.35
1	15	122.5	8.80 10^7	0.33
	30	100.2	1.93 10^8	0.29
	45	93.1	3.42 10^8	0.32
	60	86.4	4.61 10^8	0.34
1.5	15	91.2	5.31 10^7	0.20
	30	88.2	1.80 10^8	0.15
	45	83.9	3.05 10^8	0.15
	60	86.2	4.32 10^8	0.16
2	15	115.5	8.33 10^7	0.29
	30	106.1	1.66 10^8	0.27
	45	93.2	2.98 10^8	0.30
	60	91.7	4.32 10^8	0.31

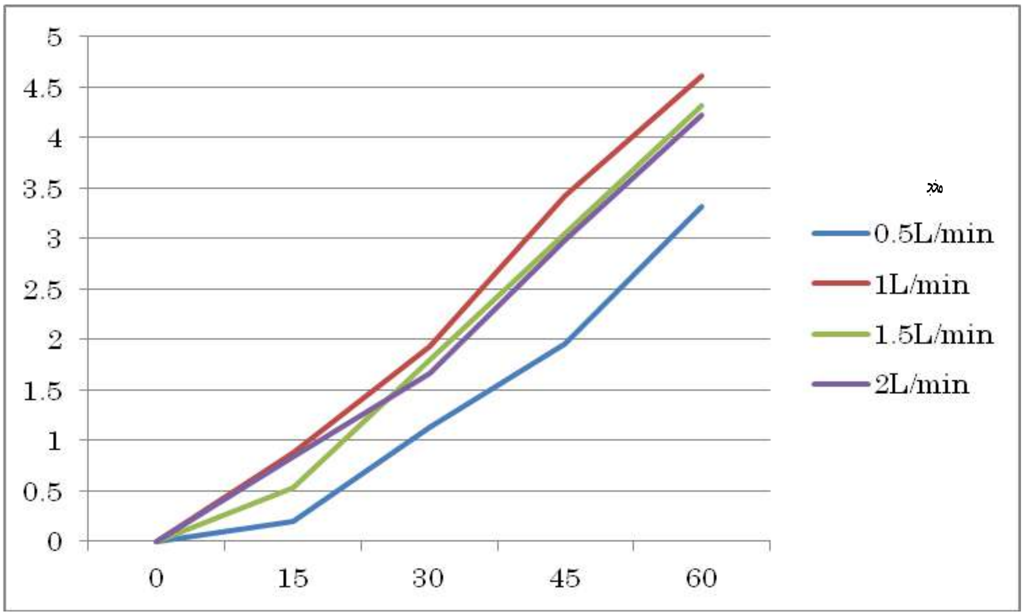


ʟ ♫ ̲̓ Ḍ ঌ ȭ ȳ œ ǵ UFB Ȝ



ʟ ♫ ̲̓ Ḍ ঌ ȭ ȳ œ ǵ ̋H ↓ ʤ Ȝ

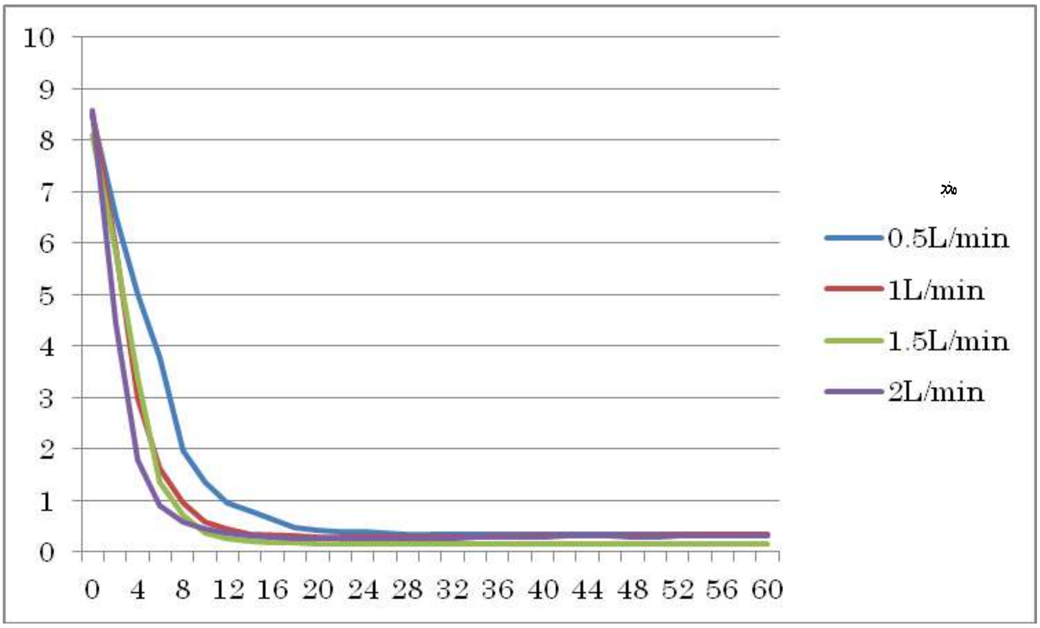
¥10⁸ ′H/ml



ы ۴ й

ˡ ݫ ◖ ঙ ő ӯ œ ǵ UFB ȝ

″H ↓
mg/l



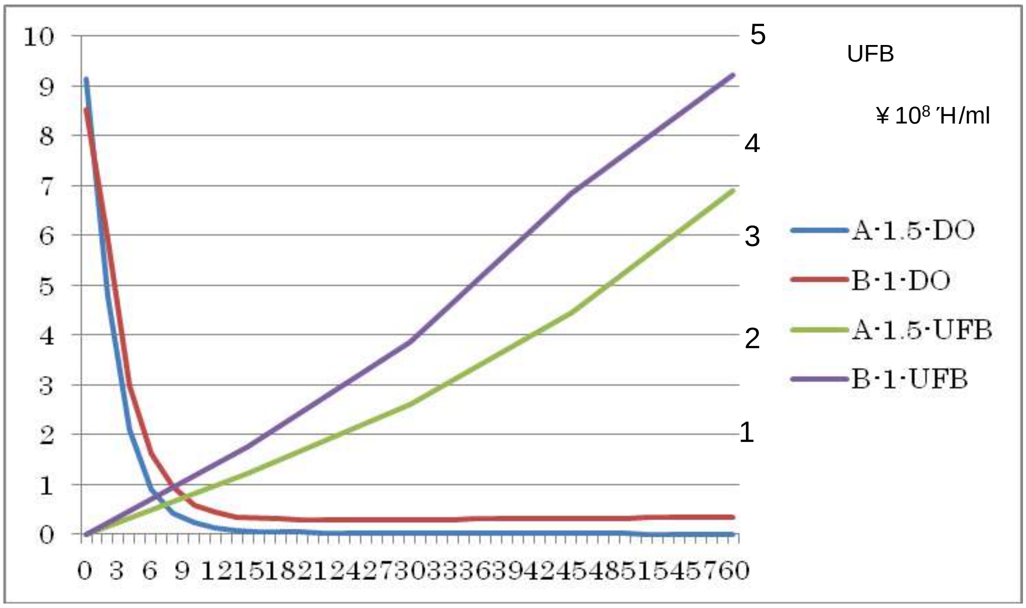
ы ۴ й

ˡ ݫ ◖ ঙ ő ӯ œ ǵ ″H ↓ ʤ ȝ

ǔ ȓ Ȁ ǵ ٻ ŏ Ȁ Ʊ ″H ↓ ș ʤ ǜ Ǣ Ȓ Ğ ̀ ǅ Ⱶ ș ʣ Ǖ Ȓ ǔ ȝ Ǔ ҧ ٻ ȝ ǉ Ȓ Ǔ Ʊ Ǥ ȓ ǥ ȓ ǵ ঙ ő ӯ œ ǅ Ⱶ ۶ Ǳ Ǔ ǉ Ȓ ǔ ȝ Ǔ Ȗ ŏ Ǫ Ğ Ƴ ѐ Ğ Ʊ UFB ҧ Ǒ ô Ấ ″H ↓ ǅ ǫ ǋ ǭ Ʊ ♫ ݲ Ḍ ঙ ő ӯ œ Ȝ ۶ ǐ ŏ Ǫ Ğ 1.5L/ й ǵ Ī ȝ ݫ ◖ ঙ ő ӯ œ Ȝ ۶ ǐ ŏ Ǫ Ğ 1L/ й ǵ Ī ȝ ș Ǵ ǭ ˡ ǅ Ā Ƴ

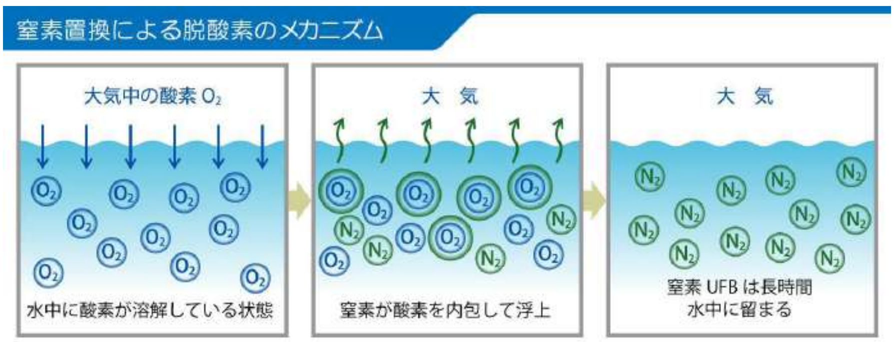
˝H ↓

mg/l



˪ ♫ ̲́ Ḍ ञ ō ÿ œ A ǯ ڗ ◖ ञ ō ÿ œ B ǵ ʒ ڂ

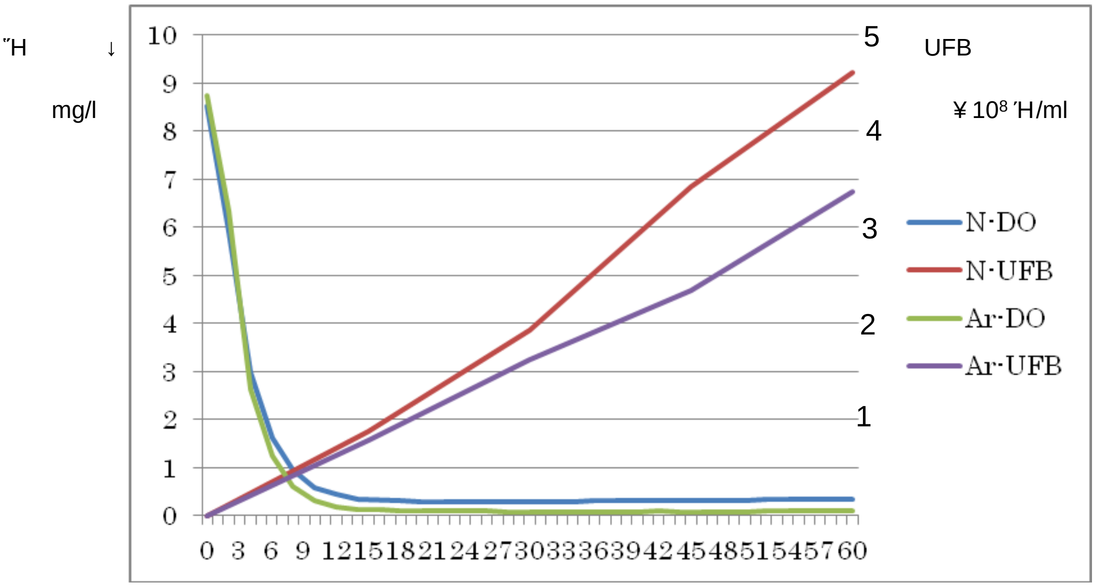
♫ ̲́ Ḍ ञ ō ÿ œ Ǔ ˝H ↓ ş ʤ Ǖ Ȓ ʒ Ⱨ ₲ Ẏ ǔ Nj ô Ā ǯ Ǉ Ȓ Ǔ Ʋ UFB ǵ ʒ Ⱨ ڭ Ȑ ŏ Dz ڗ ◖ ञ ō ÿ œ Ǔ Ẏ ǔ Nj Ƴ ǚ ǵ ǚ ǯ Ⱨ Ʋ ˝H ş ʤ Ǖ Ȓ ɟ ę ɉ ȸ ɞ ǯ UFB ş Ṕ î Ā ɟ ę ɉ ȸ ɞ ǯ Ǔ ʬ ā Ā ï ̄ ā ǯ Ⱨ DZ Nj ǚ ǯ ş Ā ǭ Nj Ȓ Ƴ ǚ ȓ è ǯ Ʋ UFB Dz ô Ȓ ˝H ş‸ ʤ Dz ǫ Nj ǭ Ⱨ Ʋ ˪ Dz ٿ ˪ ş Ā ڭ Ǔ DZ ǜ ȓ ǭ ǔ Ğ Ƴ è Ğ Ʋ ˝H Ǔ UFB ǵ ǵ ő ǯ DZ Ȓ ǯ ì Û ȓ ǭ Nj Ğ Ƴ Ā ŏ Ā DZ Ǔ Ȓ Ʋ ˝ ˡ ǵ ب ŏ Ȑ Ⱨ UFB ǵ ˝H̏ ǯ ˝H ǯ Dz ڭ Ȑ ŏ DZ Ⱨ Ā Ȓ ǚ ǯ Ǔ ǯ ǔ DZ ŏ Ǫ Ğ Ƴ ˪ ǵ ˝H ş Ⴉ Ч Ā Ȓ Ⱨ UFB ǯ Ā ǭ ˝H̏ Ā Ȓ ǯ Ⱨ DZ ǚ Ʋ ƅ Ǔ Ẏ ǔ ǚ ʣ Ā î Ā Nj FB ǯ Ā ǭ ˝H̏ Ā ǭ Nj Ȓ̊ ˥ Ǔ Ǉ Ȓ Ƴ UFB ǵ ҧ ب ş ی Ā Ȓ DZ Ⱨ Ʋ ˝H Ⱨ Ị Dz Ǒ Nj ǭ ǵ ő ǯ Ā ǭ ڪ Ā Ʋ Ɉ Ȓ ῃ ؤ Dz ô Ȓ ی Ǔ ʬ ǯ Ǉ Ȓ Ƴ



˪ ́ Dz ô Ȓ ˝H ˝Ḥ ǵ ڦ̄ ˪ NANOX ǵ HP ô ȓ̀

’ ĀȒŐ ȷ ǵ Ǆ ô Ȓ◙

2019 ₴ 6 ؿǄȠ ɩ Ȳ ɱ Ǔ ʋ ﮊ ĸ ȝ Ā ǭ ˚ ǜ ȓ Ǧ ǚ ȝ Ǆ ô ȓ Ʊ ʤ ﮨ ˥ Ő ȷ ȝ Ā ǭ ȝ B Ǆ ȝ ǔ Ȓ ô Ă Ǆ Ǆ Ǫ Ǧ Ƴ Ƞ ɩ Ȳ ɱ Ƕ ɢ ῃ ӯ 8 ȸ Ǔ ˝Ḥ ǜ ǋ ǚ ȝ ŏ Ȑ Ʊ Ǧ Ṭ Ǹ ǖ ǵ ǄƂ ȓ Ȇ ȋ Ā ǖ Ǆ ä Ǆ ˝Ḁ ǟ Ā Ȓ ǚ ȝ Ǔ Ȝ ǔ Ȓ 5 Ƞ ɩ Ȳ ɱ ǵ ʋ ﮊ ĸ ǵ˜ ʋ Ǆ Ā Ȓ ˛ Ḻ ɳ ƽ Ƴ è Ǧ Ʊ Ƞ ɩ Ȳ ɱ ´ ɥ ȝ Ƕ ´ ɥ ô ȓ ɧ ǵ Ṕ ﺳ ş ɨ Ψ Ā ᵀ ʋ Ḁ Æ ş ├ Ā Ǧ ȝ ȉ Ḻ ɳ ǜ ȓ ǭ ǋ Ȓ ˉ Ƴ ǚ ȓ Ȓ ǵ ˥ Ƕ ﯖ Ǆ ﮒ Ȥ Ǆ ˥ ȝ ǉ Ȓ ȝ ┐ Û ȓ Ȓ ǵ Ȝ Ʊ Ƞ ɩ Ȳ ɱ UFB Ǆ ǫ ǋ ǭ Ḫ ﯖ Ǆ ş Ǫ Ǧ Ƴ ˝H ↓ ǵ Ẁ ä ȝ UFB ǵ Ẁ ä ǵ Ȯ ɧ ɓ ş ˪ Ǆ Ā Ƴ



˪ Ƞ ɩ Ȳ ɱ UFB ȝ UFB ǵ ﺧ

ǚ ǵ ﺑ ŏ Ȑ Ʊ Ƞ ɩ Ȳ ɱ Ƕ ˝H ş ˝Ḥ ǜ Æ Ȓ ȝ Ƕ Ẏ ǚ ǋ Ǔ Ʊ UFB ǵ Ƕ ô ȓ ˝Ḥ Ǆ ǋ ǚ ȝ Ǔ ǹ ŏ Ǫ Ǧ Ƴ

ﻏ ˩ ǵ UFB ǵʰ ˝H ő ʋ ˥

ɉ Ǆ UFB Ƕ ۴ ﻤ ʤ Ǣ ǟ Ǆ ﻐ ˩ Ǆ ﺜ ˝H Ā Ȓ ȝ Û ȓ ǭ ǋ Ȓ Ǔ Ʊʰ ˝H ˛˜ Ǆ ô Ǫ ǭʰ ˝H ˥ Ǔ◙ ş˝ ű Ȓ ŏ ǰ Ă ŏ ş ﯼ Ā Ǧ Ƴ

ɞ Ɉ Ɏ ɔ ɩ ş ǋ ǭ Ā Ǧ UFB ﻐ ş Ő ɧ ȷ Ǆ Ì Ʊ ʤ Ǆ Ǔ ȝ ǔ Ǆ ǋ ô Ă Ǆ ˝Ω ﺿ Ā Ʊ Ū ɲ Ʊ ū Ɔ Ǣ ǟ Ǆ ʻY Ʊ Ǔ Ɔ Ā ǭ ʻY Ʊ ǵ ˛˜ ȝʰ ˝H Ā Ǧ Ƴʰ ˝H

ﭏ Ꮘ ʢ ŏ ۑ è Ǯ ǯ Ā ۴ ΄ ȉ ï Ā ǭ UFB ǵ ↓ ŉ ⁹ ǯ Ή ﺭ ῭Ω ↓ ș ủ Ā Ğ Ƴ è Ğ Ư ̄ ǟ ô Ă Dz Ā Ğ UFB ﻐﻴ ș Ƞ ι ङ ŋ œ Ɇ ﺻ ﻧ PET 12/ PET 12/LL 60 ș ﻧ Ḍ Ā Ğ Dz C ṉ Ā ŋ œ ι Ā ǭ л ǯ Ύ Ǯʰ ῭H Ā Ư Ō ђ ȷ ǵ ȳ ɱ ɕ ι ǯ ̄ ﻨﯽ Dz ủ Ā Ğ Ƴ DZ Ŏ Ư UFB ﻐﻴ ǵ Ꮘ Ư ﻐﻴ ﻐﻴ 40L ș Ǌ Ư Ō ȷ ș 1L/ ŉ ǵ ﷽ Ǯ ̒ Ā ǭ Ư ङ Ɉ Ɣ ɔ ι Ǯ 30 ŉ ȼ ủ Ǣ ǭ Ǫ Ğ Ƴ Ō ȷ Ꮘ ǯ Ƞ ι Ȳ ɱ ș Ǌ Ğ Ƴ UFB ﻐﻴ ǵʰ ῭H ǵ ﺐ ș Dz Ư Ƞ ι Ȳ ɱ UFB ﻐﻴ ǵʰ ῭H ǵ ﺐ ș Dz Ư Ǥ ȓ ǥ ȓ Ā Ƴ

UFB ʰ ῭H ǵ ﺐ

Ή ﺭ ῭Ω ↓ ǵ Ӵ̧ Ꮘ ¥ 10^8 Ή/ml

ﺲ	ﻨﺤﻲ		ﺴﻤﺪ	ﻨﺤﻲ	
	2.56	2.56	2.56	2.56	2.56
1	2.03	2.13	3.57	5.27	4.44
2	2.37		3.01	4.02	3.39
3	2.22	2.23	2.08	5.26	3.41
4	2.52	1.84	2.06	4.1	2.03
7	2.08	1.60	1.58	4.42	2.68
15	1.70	1.11	1.61	3.08	2.74
1	1.63	1.75	1.25	2.79	2.94
2	2.37	0.89	1.82	2.57	2.22
3	1.48	1.06	2.71		

Ƞ ι Ȳ ɱ UFB ʰ ῭H ǵ ﺐ

Ή ﺭ ῭Ω ↓ ǵ Ӵ̧ Ꮘ ¥ 10^8 Ή/ml

ﺲ	ﻨﺤﻲ		ﺴﻤﺪ	ﻨﺤﻲ	
	3.13	3.13	3.13	3.13	3.13
1	2.88	3.72	3.76	4.82	5.34
2	2.36	2.70	2.04	5.67	4.34
3	1.89	2.05	3.66	5.02	3.21
4	2.11	1.85	2.41	5.41	3.35
7	1.76	1.29	1.27	4.12	2.65
15	1.70	1.27	1.12	5.46	1.91
1	1.85	1.58	1.51	3.66	2.84
2	2.35	1.05	1.08	3.13	2.15
3	1.22	1.40	2.19		

è Ğ Ư ﻭ ŏ Ȓ 15 ﻭ è ǯ ģ ﺧﻲ ﮃ ģ Ή ﹴ ΐ ↓ ģ Ẁ ä ş ᴸ ǅ Ư 15

ﻭ ♥ ŏ Ȓ 3 ɴ ﮔ ♥ è ǯ ģ ﺧﻲ ﮃ ģ Ή ﹴ ΐ ↓ ģ Ẁ ä ş ᴸ ǅ Ư Ǥ ȓ ǥ ȓ Ā

Ğ Ύ

Ŏ ô Ǻ Ƞ ɩ Ÿ ɱ ģ ǋ ā ȓ ȉ ♥ ģ ʝ Â ǰ ǯ Ή ﹴ ΐ ↓ Ǔ ῍Ḥ Ā Ư Ǥ ȓ ˚

Ƕ ↓ ģ Ή ﹴ ΐ ↓ ş ˘ Ā Ȓ ǔ ǯ Ǔ ȉ ŏ Ǫ Ğ Ύ è Ğ Ư ǯ Ƞ ɩ Ÿ ɱ ǯ Ƕ Ư ۴

ǅ Ƕ Ƞ ɩ Ÿ ɱ Ǔ î î ẉ ǋ Ή ﹴ ΐ ↓ ş Ā Ǔ Ư 1 2 Ā Ȓ ǯ ǋ ā ȓ ȉ ˉ ã ɪ ɗ

ɩ ģ Ή ﹴ ΐ ↓ ǯ Ǳ Ǫ Ğ Ύ

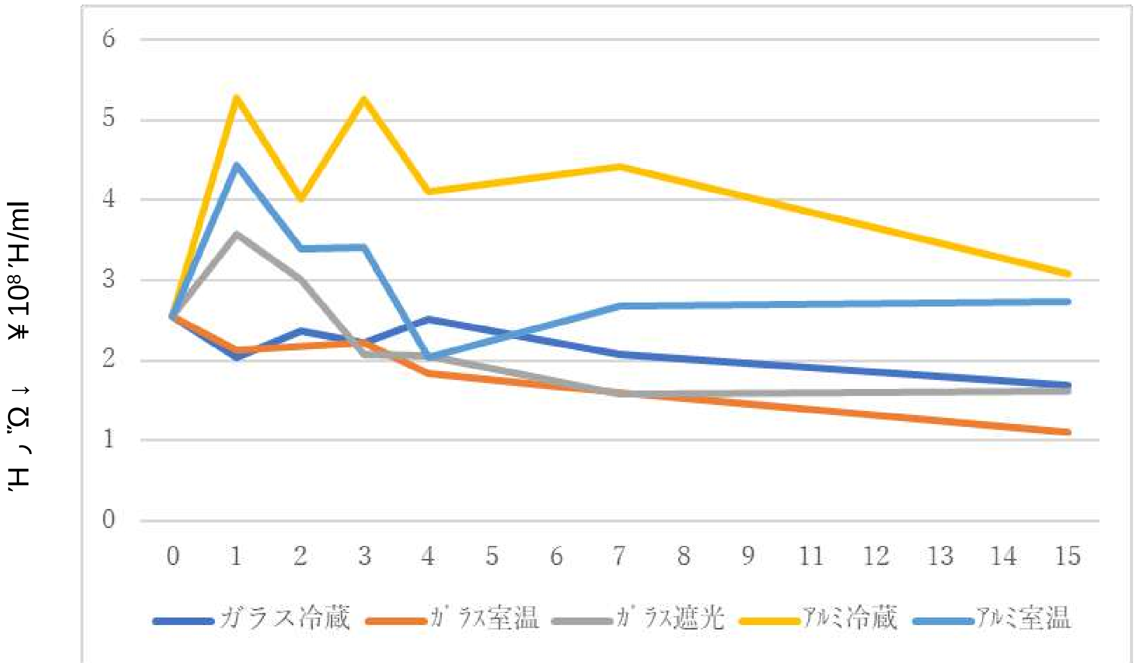
Ƞ ɩ ঊ ǯ Ƕ ﬞ ô ȓ 1 ﻭ ♥ ǅ Ή ﹴ ΐ ↓ Ǔ ǖ Ǳ Ȓ Ǔ Ȓ ȓ Ğ Ǔ Ư ʝ ŏ ﮔ

♥ ǅ Ƕ Ή ﹴ ῍Ḥ ǅ ô ȓ ﬞ ǯ ˉ ↓ ģ ɪ ɗ ɩ ǅ Ǳ Ǫ Ğ Ύ ǔ ģ ģ ˡ Ƕ ʥ ﮔ ǯ

ǉ Ȓ Ǔ Ư ﻋ ы ģ ﻐﻲ ﻐﻲ ş Ƞ ɩ ঊ ǅ Ặ Ƕ Ā ǭ ﹴ ﻭ Ā ǭ ȉ Ή ﹴ ΐ ↓ Ƕ 10⁸ Ǚ

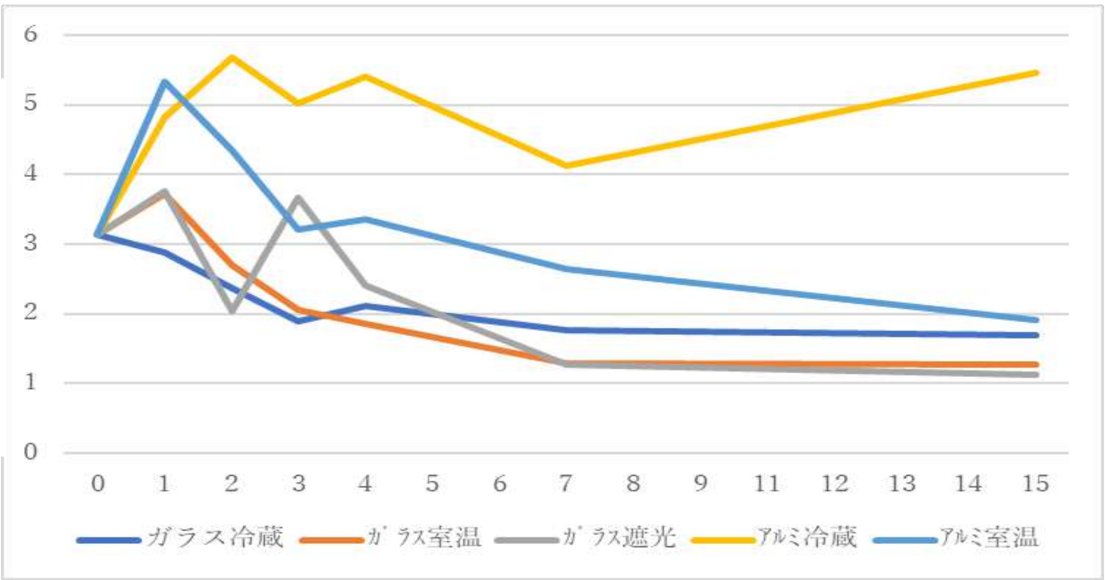
˛ ǯ Ṗ Ĭ Ȓ ǔ ǯ Ƕ ŏ Ǫ Ğ Ύ Ǳ Ŏ Ư UFB ģ/ ǅ ô Ǫ ǭ ŋ œ Ɇ ģ ɧ ῃ Ǔ ˆ

Ā Ȓ ◙ Ǔ Ĭ Ȓ ȓ Ȓ Ύ



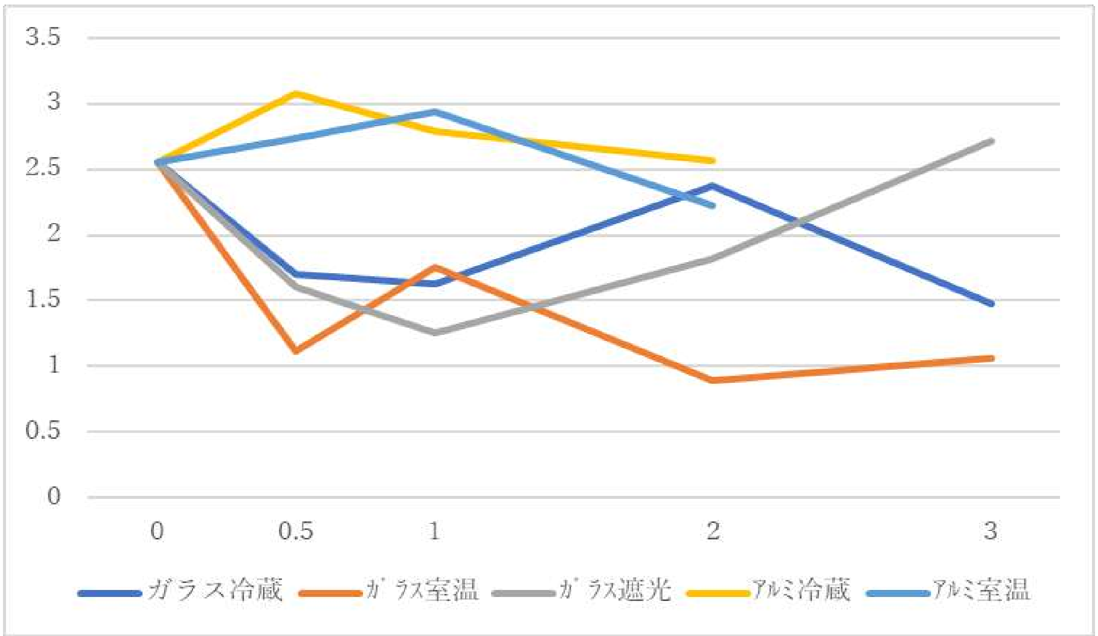
۴ ﻭ

ᴸ 15 ﻭ ♥ è ǯ ģ UFB ģ Ή ﹴ ΐ ↓ Ẁ ä



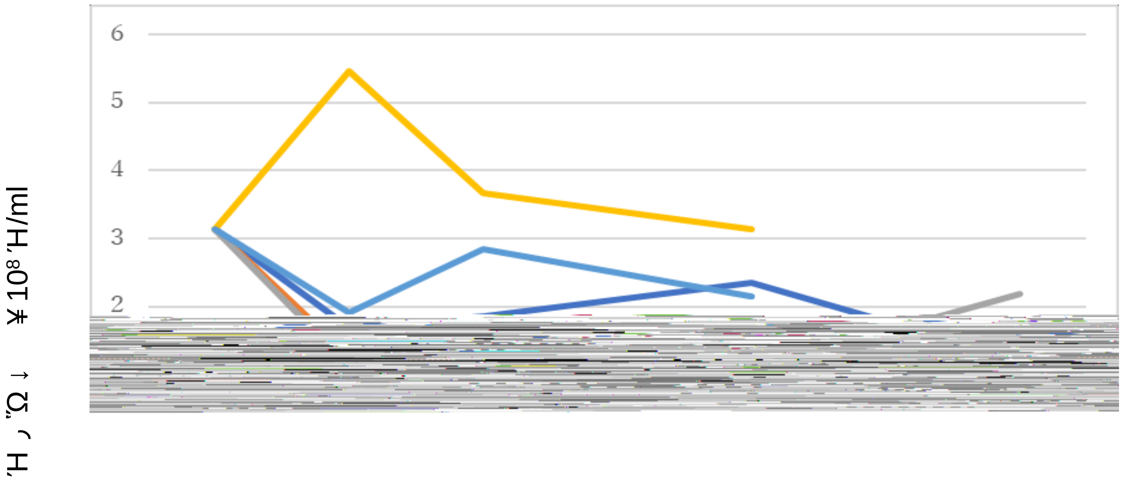
۴ ف

ᄂ 15 ف ♥ è ǯ ģ Ƞ ι Ῡ ɱ UFB ģ Ή ﾉ ̈Ω ↓ Ẁ ä



۴ گ

ᄂ 3 ɴ گ ♥ è ǯ ģ UFB ģ Ή ﾉ ̈Ω ↓ ģ Ẁ ä



۴ ڳ

ᴸ 3 ɴ ڳ ♥ è ǯ ǵ Ƞ ι Ȳ ɱ UFB ǵ ′H ر ̋Ω ↓ ǵ Ẁ ä

ʰ ̋H ͅ ̏ Dz ǫ Nj ǭ ′H ر ̋Ω ↓ ŏ Ȑ R̂ ǯ Ʊ ǯ Ƕ л ʰ Ŭ ′Y ʰ ǵ ȉ ǵ ȏ ȓ ȉ

̋H̦ Ŭ ̋H̦ ȕ ǖ DZ Ǫ Ğ Ƴ Ƞ ι Ȳ ɱ UFB ы Ǟ Ğ ڂ ș 2 ɴ ڳ л ʰ Ǟ Ğ Ȋ ͅ Ƕ′H

ر ̋Ω ↓ Ŭ Ẏ ŭ ǖ DZ Ǫ Ğ Ŭ Ʊ 3 ɴ ڳ ♥ ǯ Ƕ′Y ʰ Ǟ Ğ ڂ ǵ ڎ Ŭ ′H ر ̋Ω ↓ Ƕ Ẏ ŭ ǖ

DZ Ǫ Ğ Ƴ Dz Ʊ Ɔ Ǟ Ğ ڂ ǯ Ƕ′H ر ̋Ω ↓ Ƕ ڏ Dz Ẏ ŭ ǖ DZ Ǫ Ğ Ƴ ǚ ǵ Ƞ ι Ȳ ɱ ǵ 3 ɴ

ڳʰ ǵ ڂ ǯ ᴀ ǵ ↓ ǹ ⁹ ș ᴸ Dz Ǟ Ƴ

ᴸ Ƞ ι Ȳ ɱ UFB ﻔﻲ 3 ŏ ڳʰ ǯ ᴀ ǵ ↓ ǹ ⁹