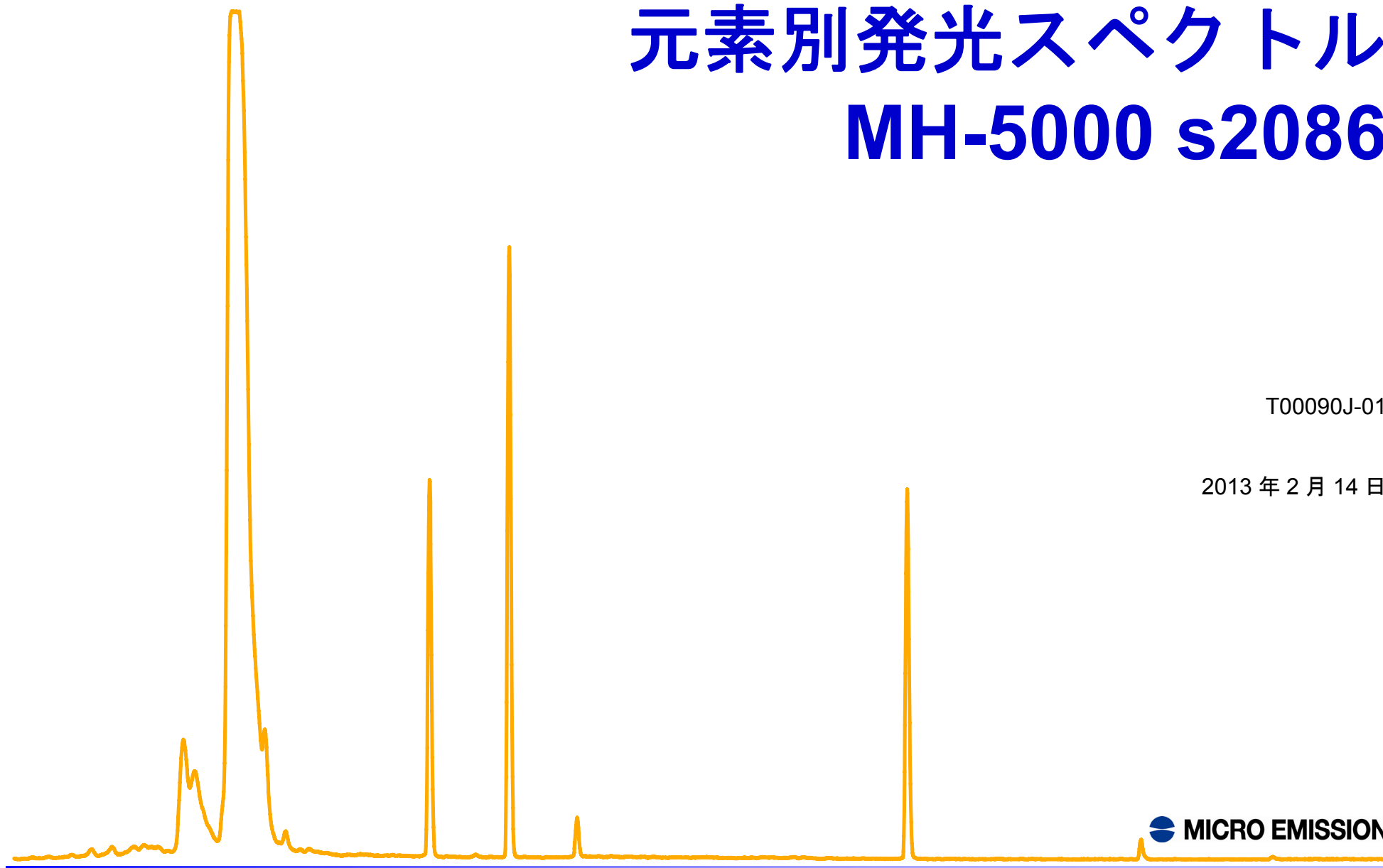


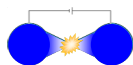
元素別発光スペクトル

MH-5000 s2086

T00090J-01

2013 年 2 月 14 日





目的： 元素ごとのピーク位置と相対的な高さを参照する際にご利用ください。

注： ここに掲載されたスペクトルは参考です。測定装置・容器による差異があるため、この文書に記載された溶液・測定条件で測定しても、ピーク高さが異なることがあります。

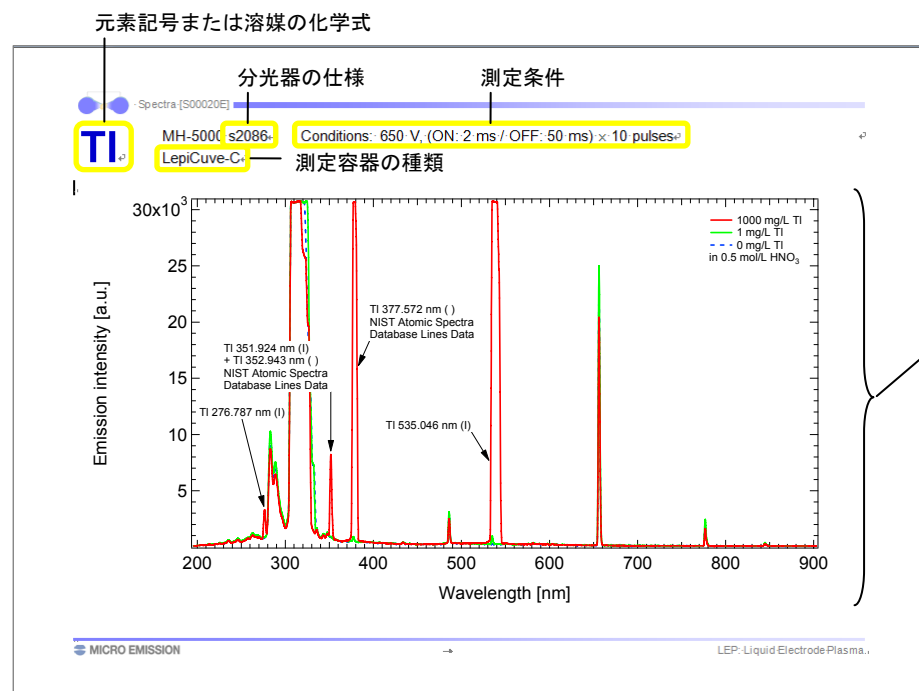
測定装置： MH-5000 シリーズ

測定液： 単元素 1000 mg/L 標準液を使用し、標準液と同じ溶媒で適宜希釈しました。ただし、溶媒の導電率が低い場合や、溶媒がアルカリ性の場合は、酸を添加しました。Na, K, Mg, Ca, I は、1000 mg/L 超の液を測定するため、NaCl, KCl, MgCl₂, CaCl₂, KI の水溶液を調製しました。

注： 高濃度の Cr, Fe を含む液を測定すると、狭小部に酸化物が生じて石英製容器を劣化させます。本測定ではこのような現象が起きないように、低い濃度の液を測定しています。

測定条件： 分光器、測定容器、溶媒、ピーク高さに応じて調整しました。

凡例：



ピーク位置および種類は、下記文献を参照して記載しています。

原子ピーク（中性原子線、イオン線）：

Phelps, F. M., III. M.I.T. Wavelength Tables Vol. 2: Wavelengths by Element; The MIT Press: Cambridge, MA, 1982

分子ピーク：

Pearse, R.W.B. and Gaydon, A.G., THE IDENTIFICATION OF MOLECULAR SPECTRA, Chapman and Hall, London, 1976

これら以外の出典より参照した場合は、該当ピーク波長の下に出典を記載しました。

目的元素のピークが見えない場合は、スペクトルの上部中央に N.D. と記載しました。

標記の分光器で測定したスペクトル

縦軸：発光強度[a.u.]、横軸：波長[nm]

ピークの表示例 1：

TI 535.046 nm (I)

原子ピークの種類

(I) 中性原子線

(II) イオン線

() 出典に記載なし

分子ピークには記載していません。

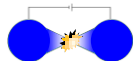
波長

元素名、分子名

ピークの表示例 2：

TI 351.924 nm (I) + TI 352.943 nm ()

“+”は複数のピークが重なって観測されている可能性があることを示します。

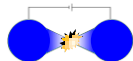


元素別発光スペクトル MH-5000 s2086

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	H																	He
2	Li	Be											B	C	N	O	F	Ne
3	Na	Mg											Al	Si	P	S	Cl	Ar
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
6	Cs	Ba	*	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
7	Fr	Ra	**															

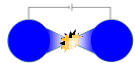
凡例	
Li	検出した
I	1000 mg/L で小さいピークを検出した
Be	検出せず
H	未測定

*	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
**	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr



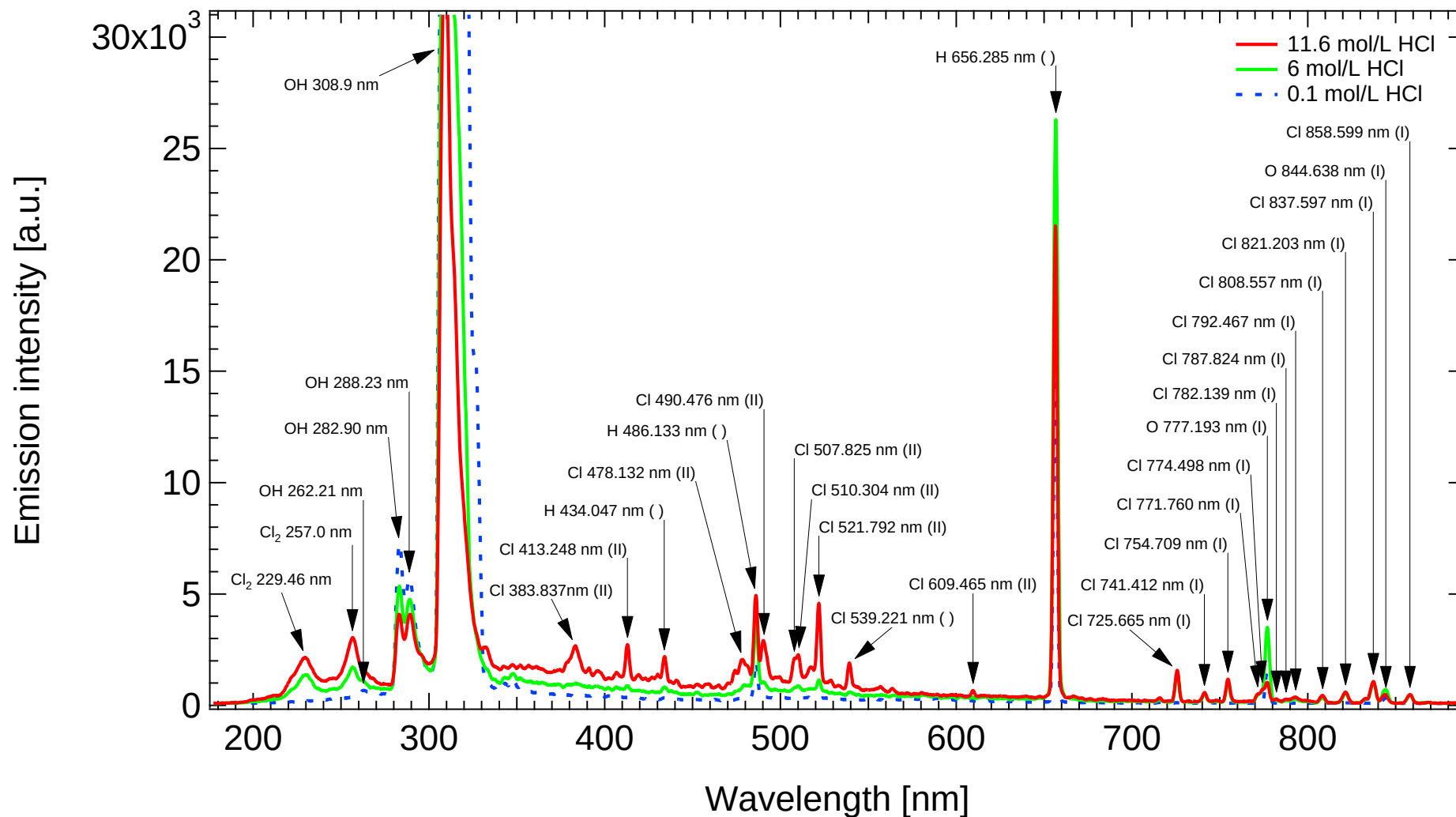
名称	備考	改訂日
HCl	溶媒	2013/02/14
HNO ₃	溶媒	2013/02/14
H ₂ SO ₄	溶媒	2013/02/14
Ag		2013/02/14
Al		2013/02/14
As		2013/02/14
Au		2013/02/14
B		2013/02/14
Ba		2013/02/14
Be	検出せず。s2035 では検出した。	2013/02/14
Bi		2013/02/14
Ca - 1	低濃度	2013/02/14
Ca - 2	高濃度	2013/02/14
Cd		2013/02/14
Co		2013/02/14
Cr	酸化物の生成注意	2013/02/14
Cs		2013/02/14
Cu	OH 308.9 nm ピークに重なりやすい。	2013/02/14
Eu		2013/02/14
Fe	酸化物の生成注意	2013/02/14
Ga		2013/02/14
Ge	1000 mg/L で小さいピークを検出した。	2013/02/14
Hg		2013/02/14
I	1000 mg/L 超でピークを検出した。	2013/02/14
In		2013/02/14
Ir	検出せず。s2035 では検出した。	2013/02/14
K - 1	低濃度	2013/02/14
K - 2	高濃度	2013/02/14

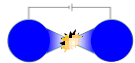
名称	備考	改訂日
La	1000 mg/L で小さいピークを検出した。	2013/02/14
Li		2013/02/14
Mg - 1	低濃度	2013/02/14
Mg - 2	高濃度。不明 (Unknown) ピークがあった。	2013/02/14
Mn		2013/02/14
Mo		2013/02/14
Na - 1	低濃度	2013/02/14
Na - 2	高濃度	2013/02/14
Ni		2013/02/14
P		2013/02/14
Pb		2013/02/14
Pd		2013/02/14
Pt		2013/02/14
Rb		2013/02/14
Rh		2013/02/14
Ru		2013/02/14
Sb		2013/02/14
Sc		2013/02/14
Se		2013/02/14
Sn		2013/02/14
Sr		2013/02/14
Tb	1000 mg/L で小さいピークを検出した。	2013/02/14
Te		2013/02/14
Tl		2013/02/14
Y	1000 mg/L で小さい分子ピークを検出した。	2013/02/14
Yb		2013/02/14
Zn		2013/02/14



HCl

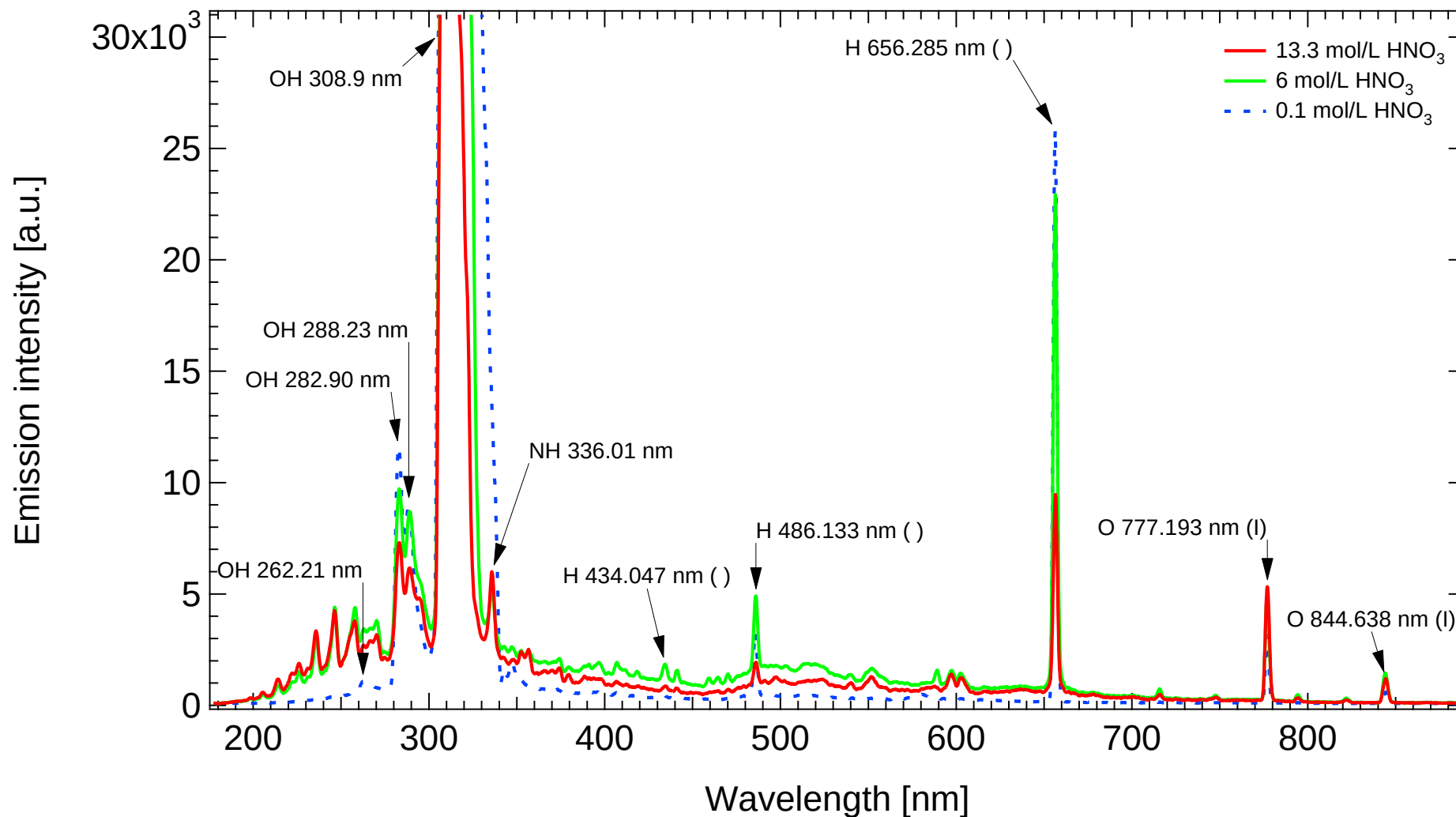
MH-5000 s2086 Conditions: 500 V, (ON: 1 ms / OFF: 120 ms) × 60 pulses ... 11.6 mol/L
LepiCuve-C 600 V, (ON: 2 ms / OFF: 130 ms) × 20 pulses ... 6 mol/L
750 V, (ON: 2 ms / OFF: 40 ms) × 20 pulses ... 0.1 mol/L

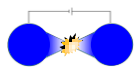




HNO₃

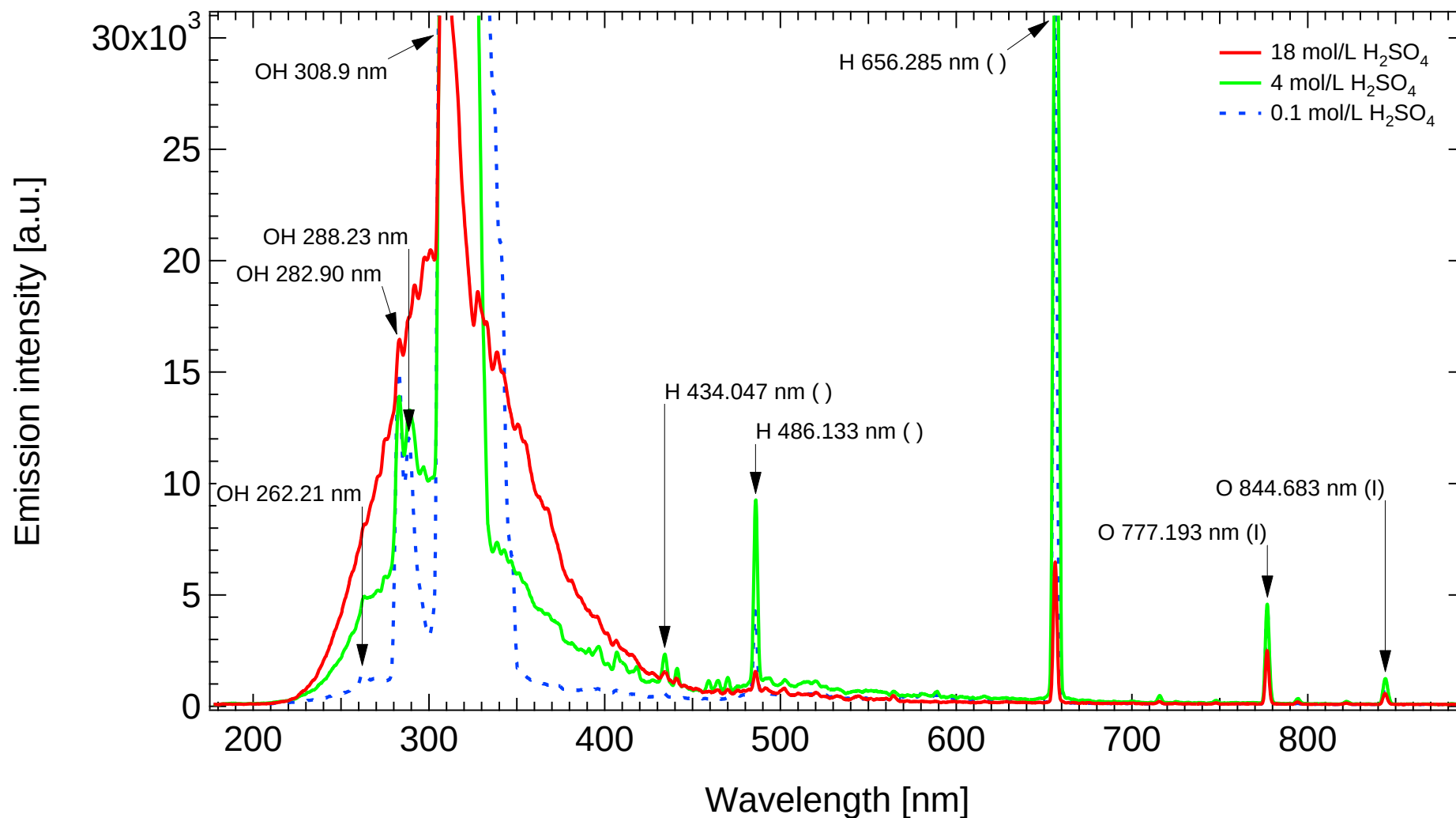
MH-5000 s2086 Conditions: 650 V, (ON: 2 ms / OFF: 80 ms) × 40 pulses ... 13.3 mol/L
LepiCuve-C 600 V, (ON: 2 ms / OFF: 120 ms) × 50 pulses ... 6 mol/L
750 V, (ON: 2 ms / OFF: 40 ms) × 20 pulses ... 0.1 mol/L

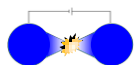




H₂SO₄

MH-5000 s2086 Conditions: 600 V, (ON: 1 ms / OFF: 100 ms) × 30 pulses ... 18 mol/L
LepiCuve-C 600 V, (ON: 1 ms / OFF: 100 ms) × 40 pulses ... 4 mol/L
750 V, (ON: 2 ms / OFF: 40 ms) × 20 pulses ... 0.1 mol/L





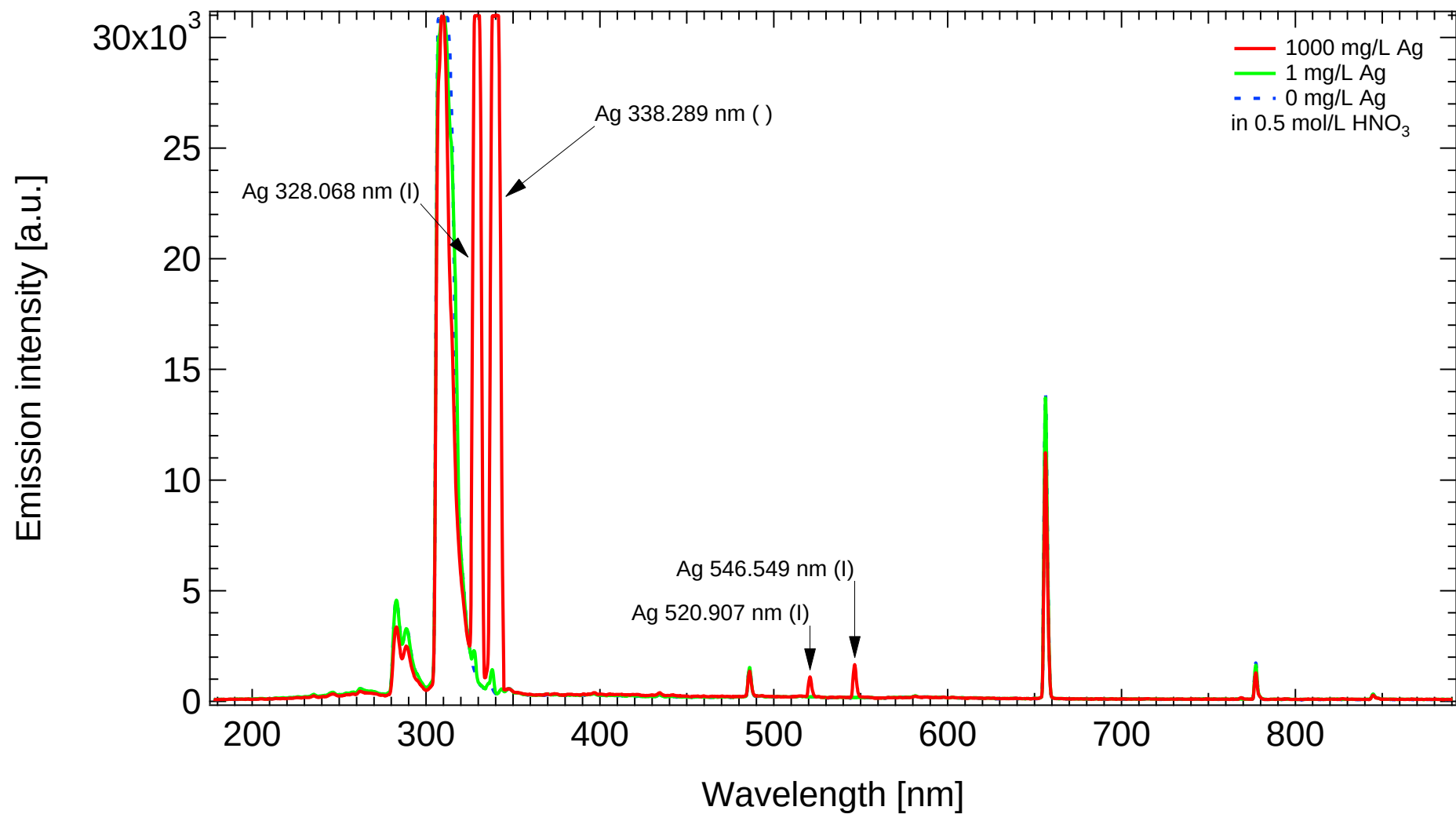
Spectra [T00090J]

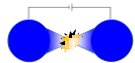
Ag

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 50 ms) × 10 pulses

LepiCuve-C





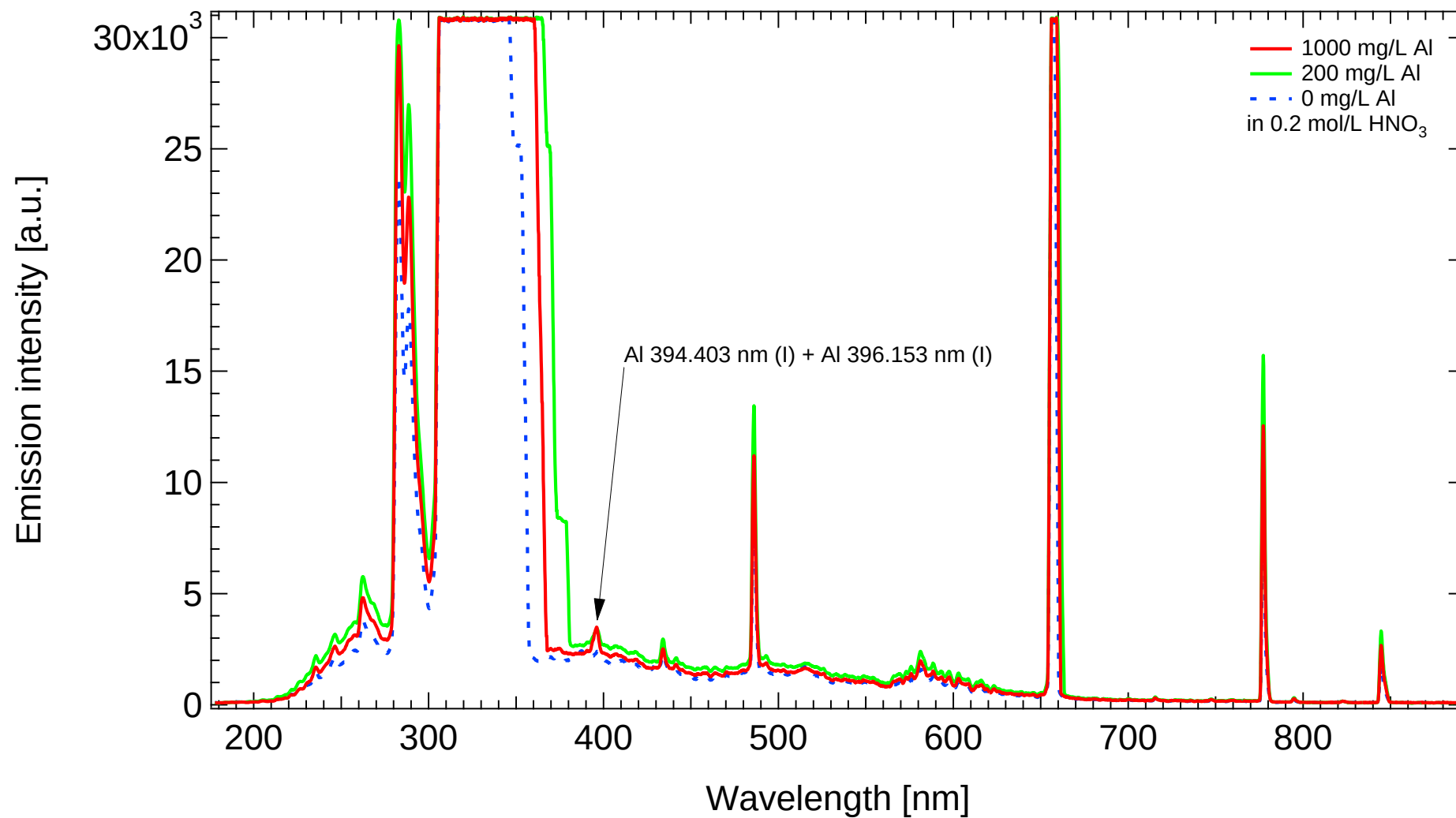
Spectra [T00090J]

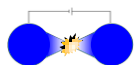
Al

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 30 pulses

LepiCuve-C





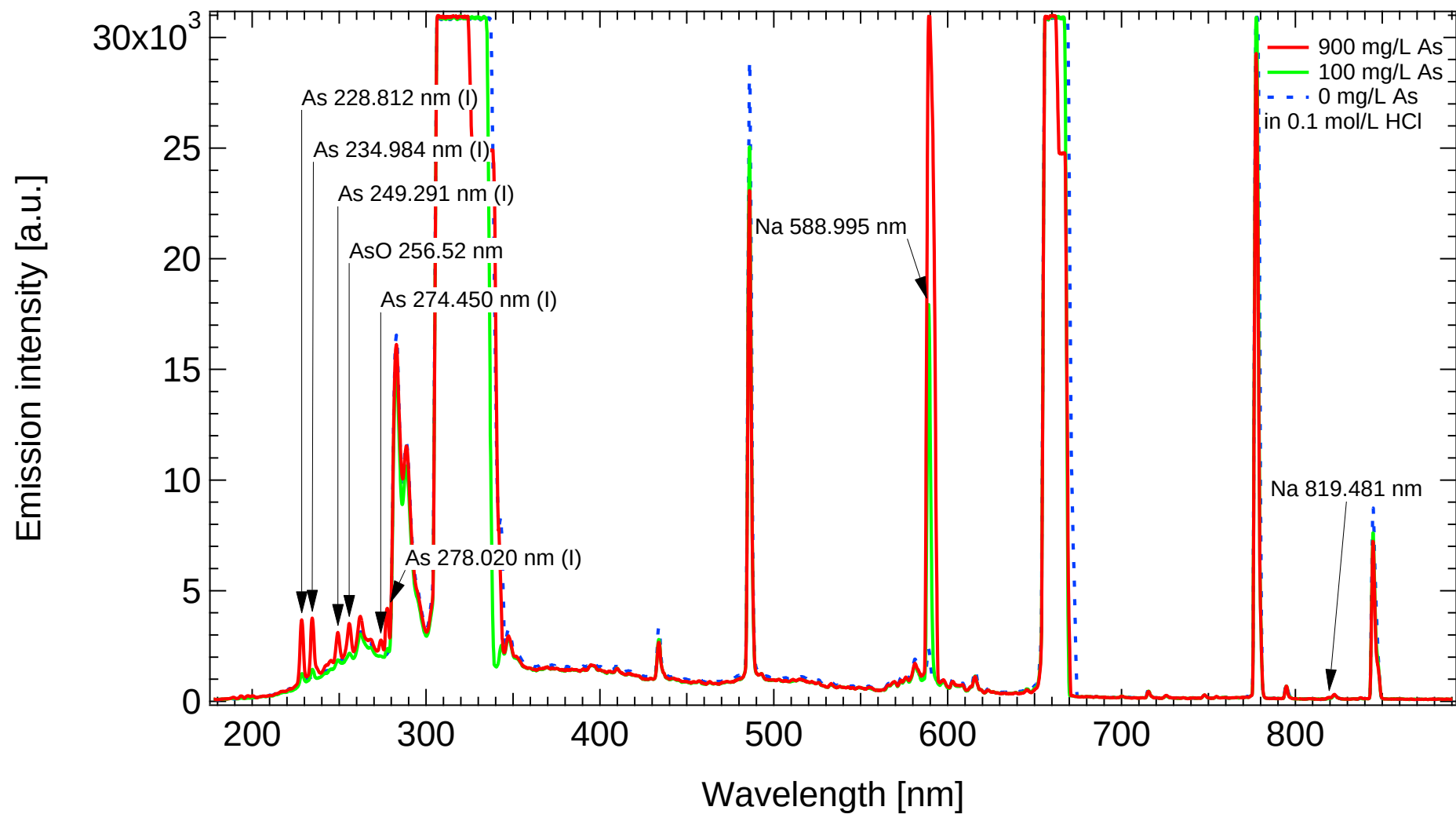
Spectra [T00090J]

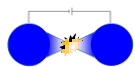
As

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 20 pulses

LepiCuve-C





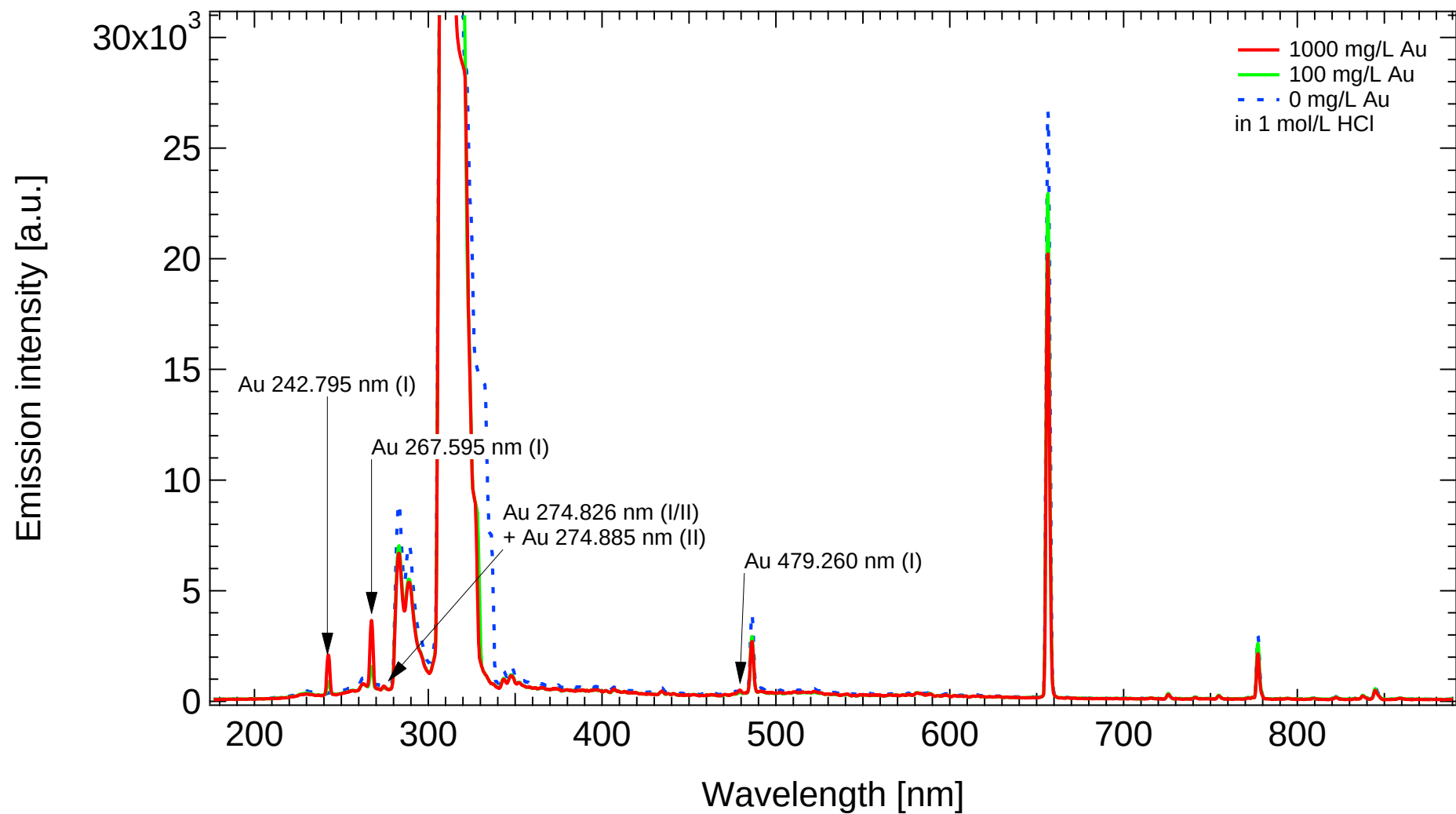
Spectra [T00090J]

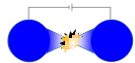
Au

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses

LepiCuve-C

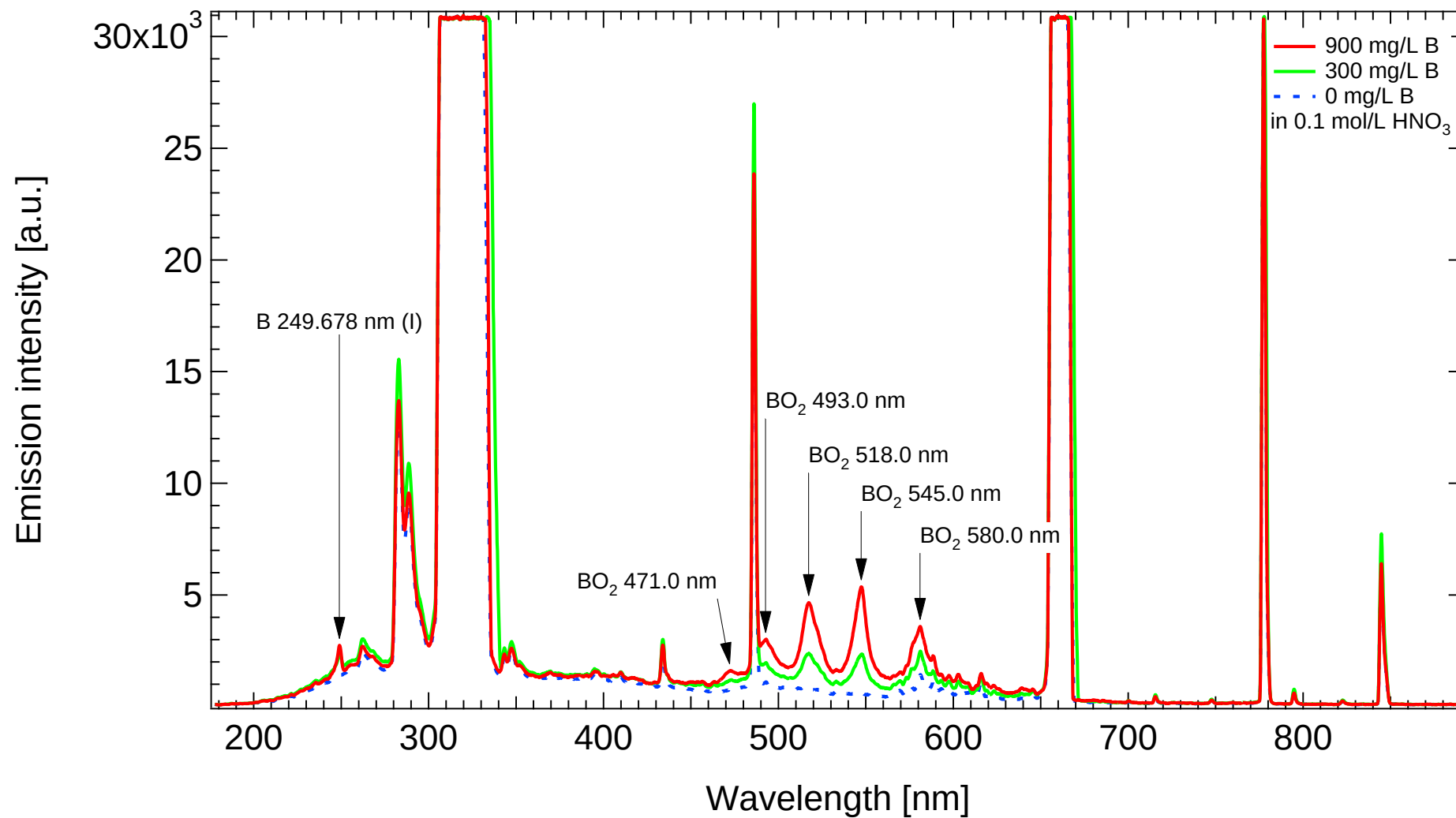


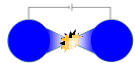
**B**

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 20 pulses

LepiCuve-C





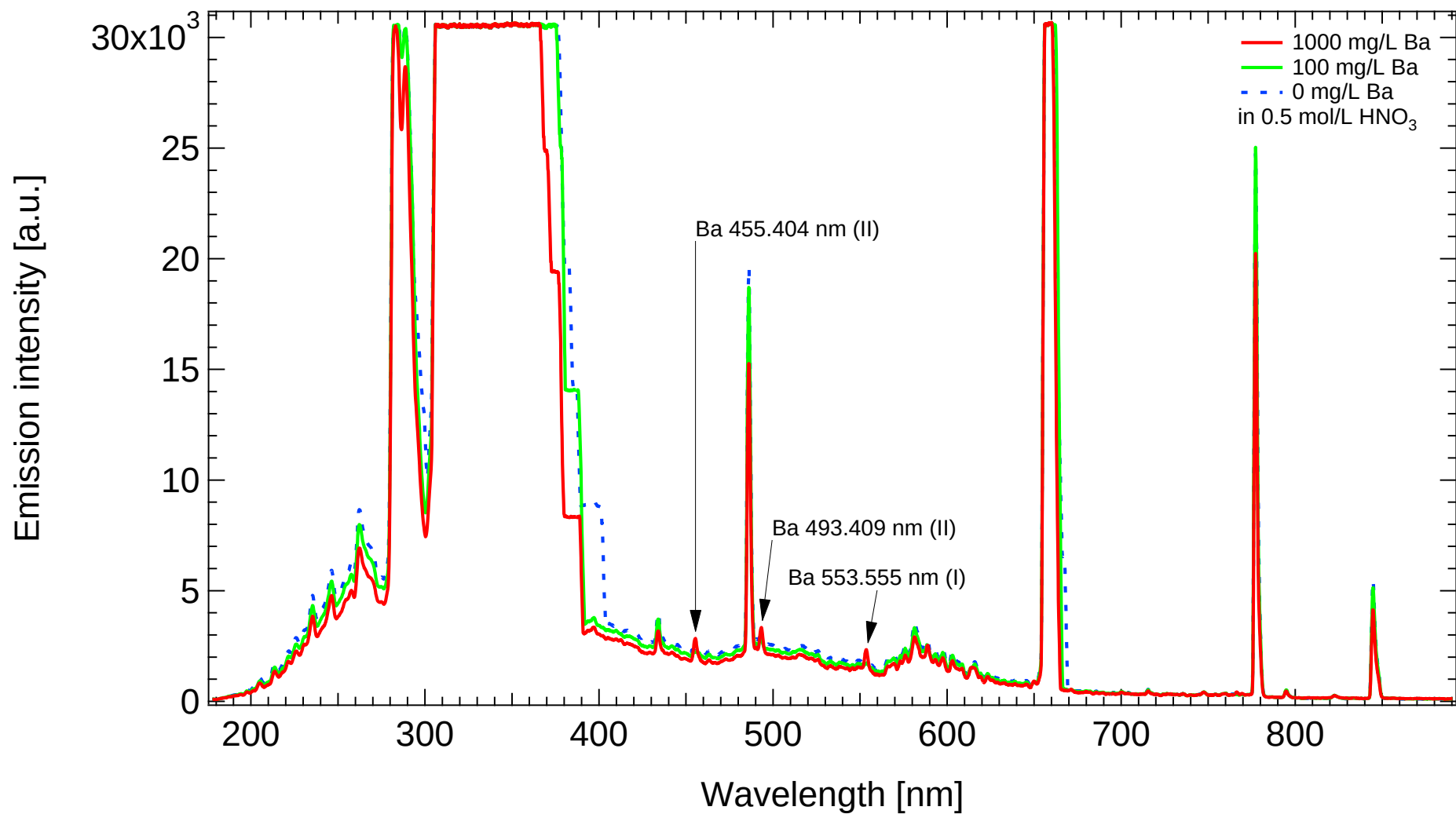
Spectra [T00090J]

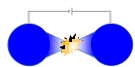
Ba

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 40 pulses

LepiCuve-C





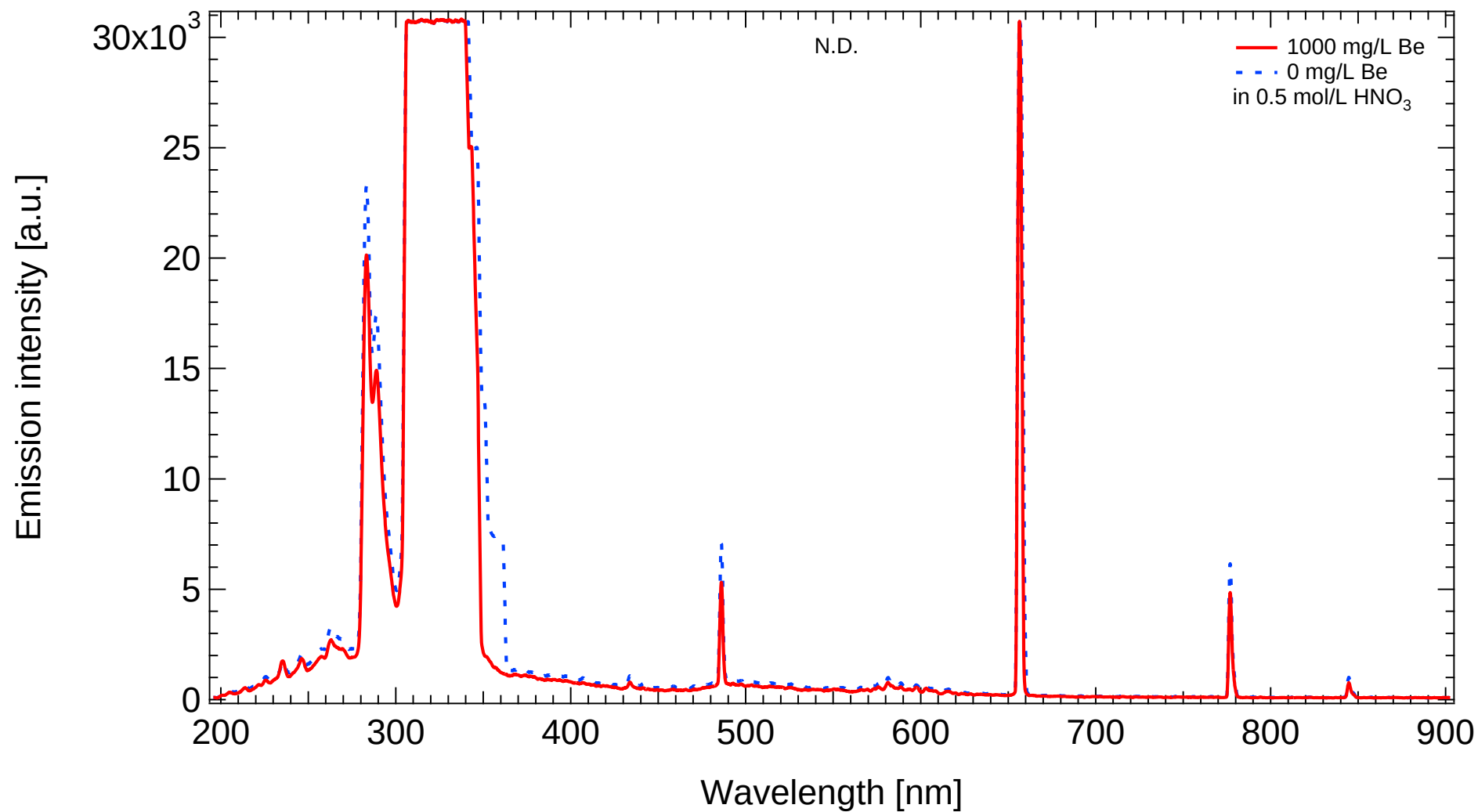
Spectra [T00090J]

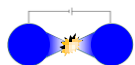
Be

MH-5000 s2086

Conditions: 700 V, (ON: 2 ms / OFF: 50 ms) × 10 pulses

LepiCuve-C





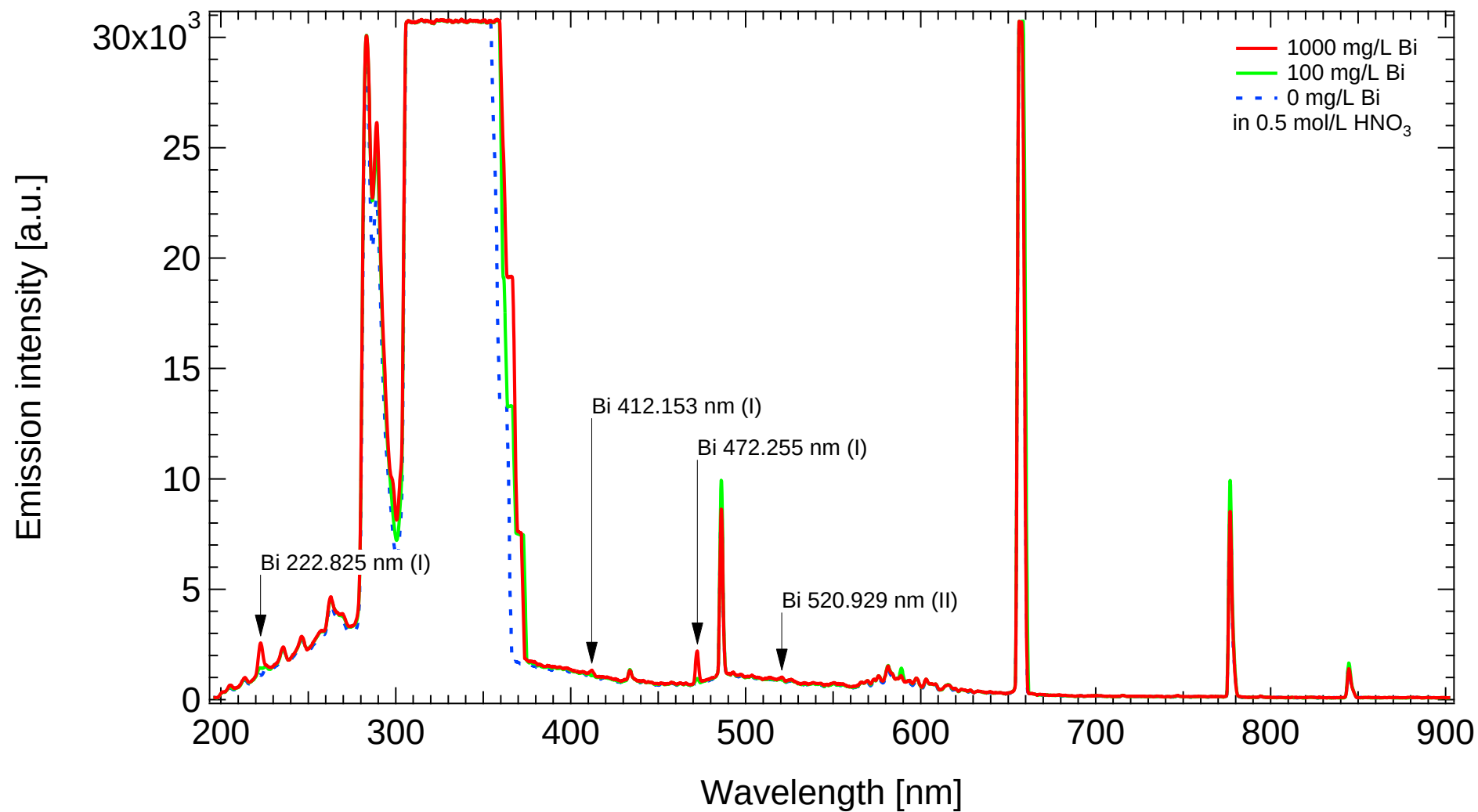
Spectra [T00090J]

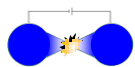
Bi

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 50 ms) × 10 pulses

LepiCuvé-C





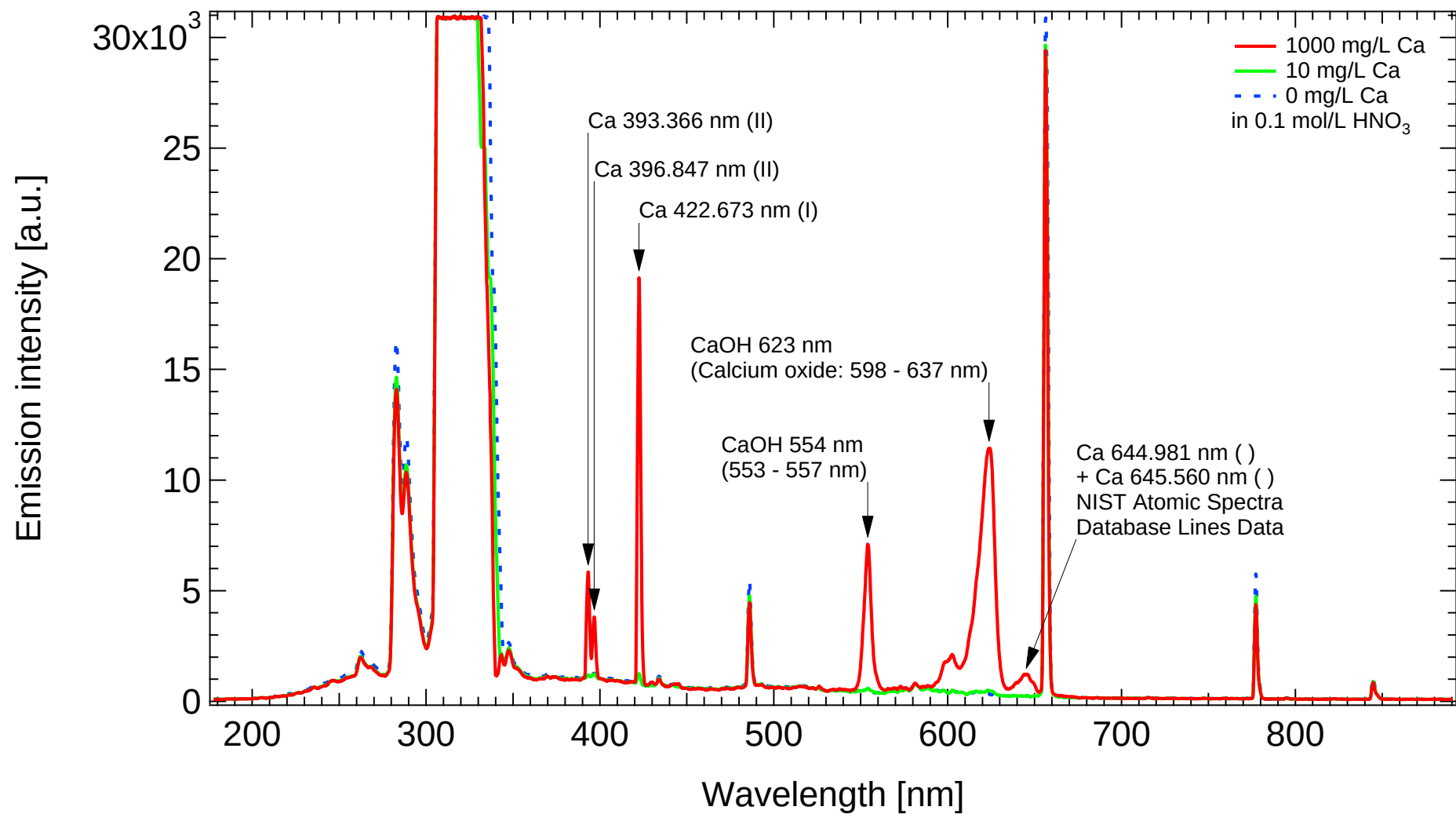
Spectra [T00090J]

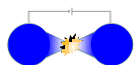
Ca

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 20 pulses

LepiCuve-C





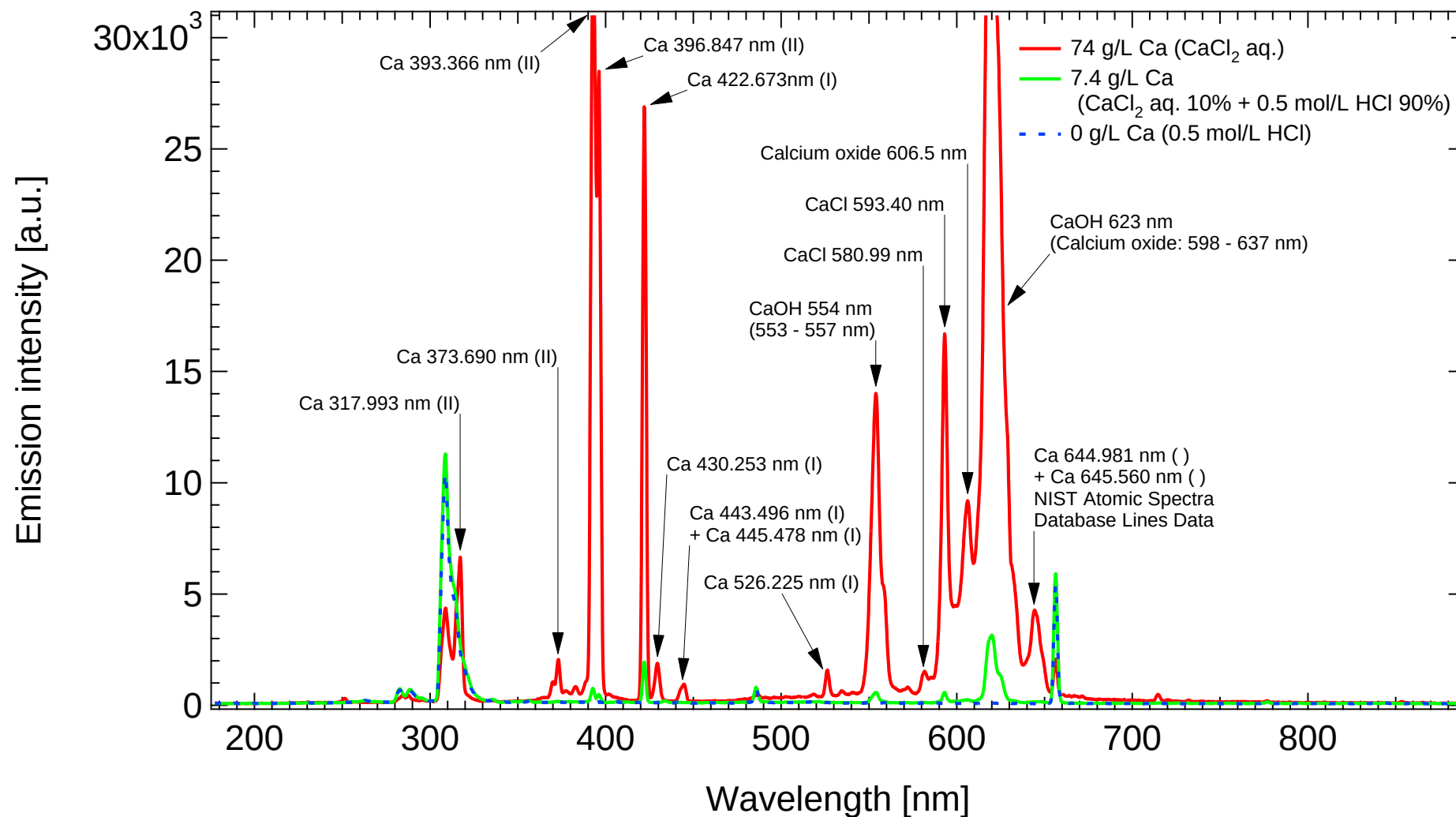
Spectra [T00090J]

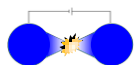
Ca

MH-5000 s2086

Conditions: 500 V, (ON: 2 ms / OFF: 50 ms) × 20 pulses

LepiCuve-C





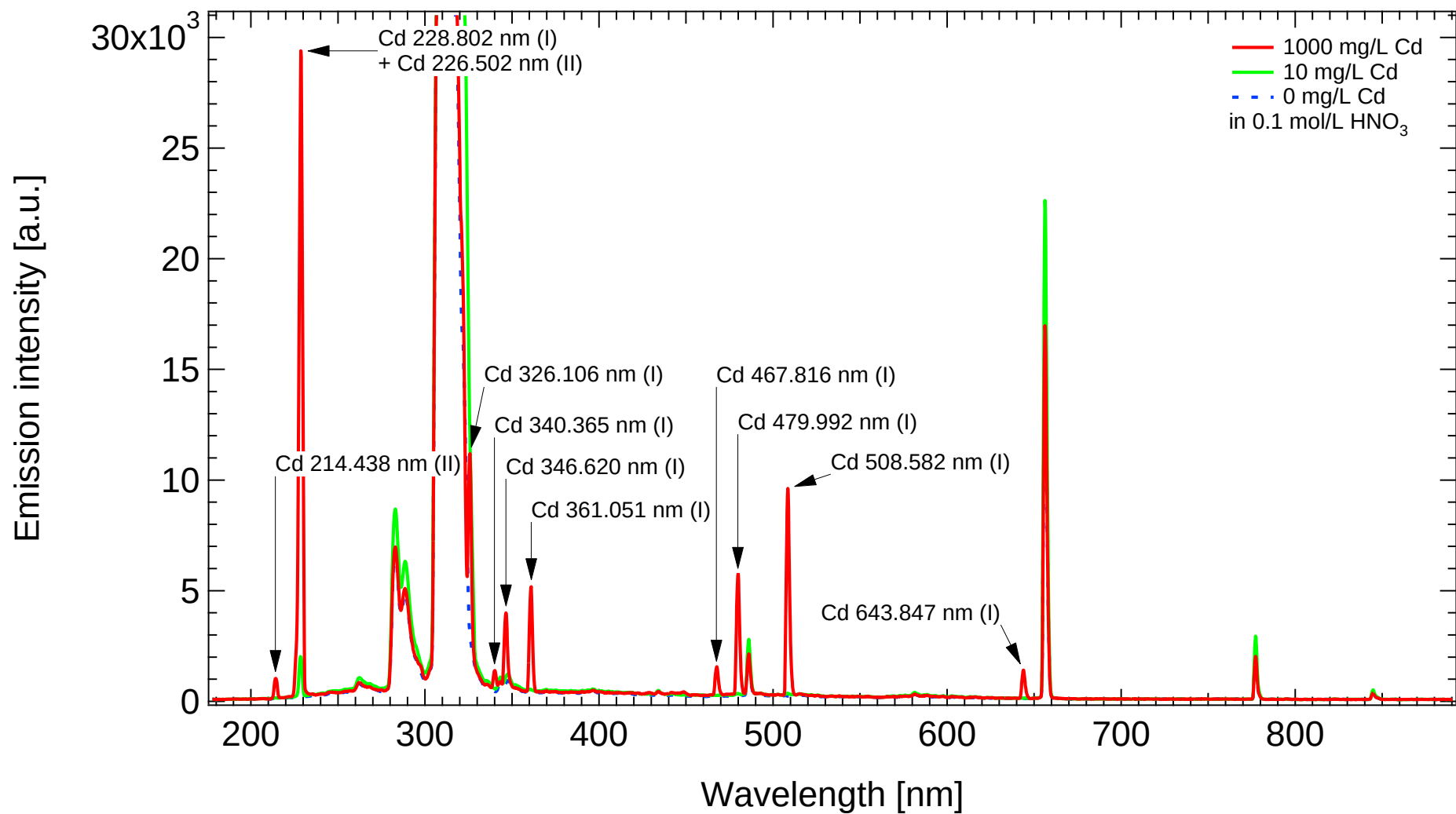
Spectra [T00090J]

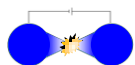
Cd

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 10 pulses

LepiCuve-C





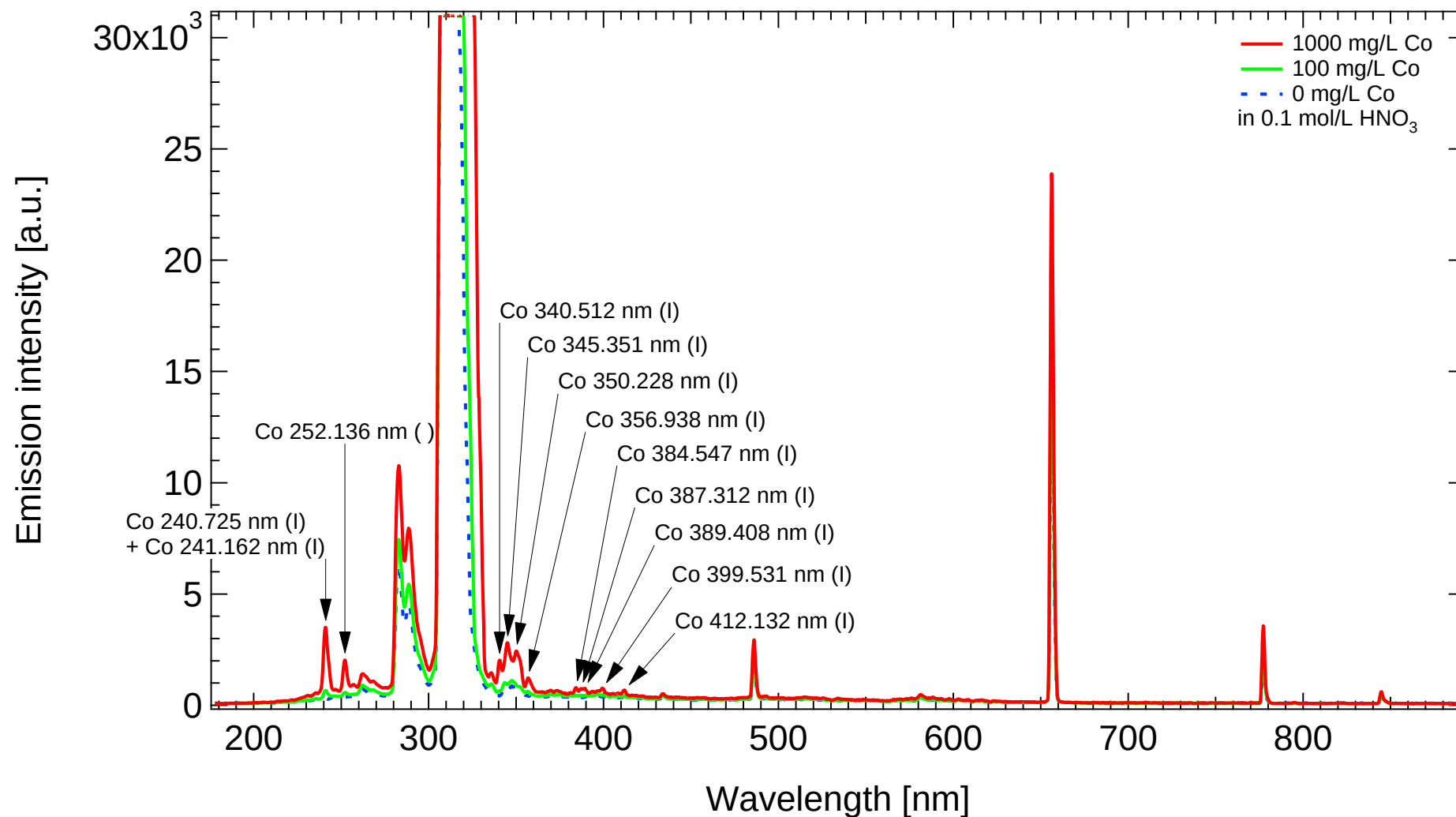
Spectra [T00090J]

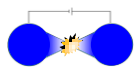
Co

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 10 pulses

LepiCuvé-C





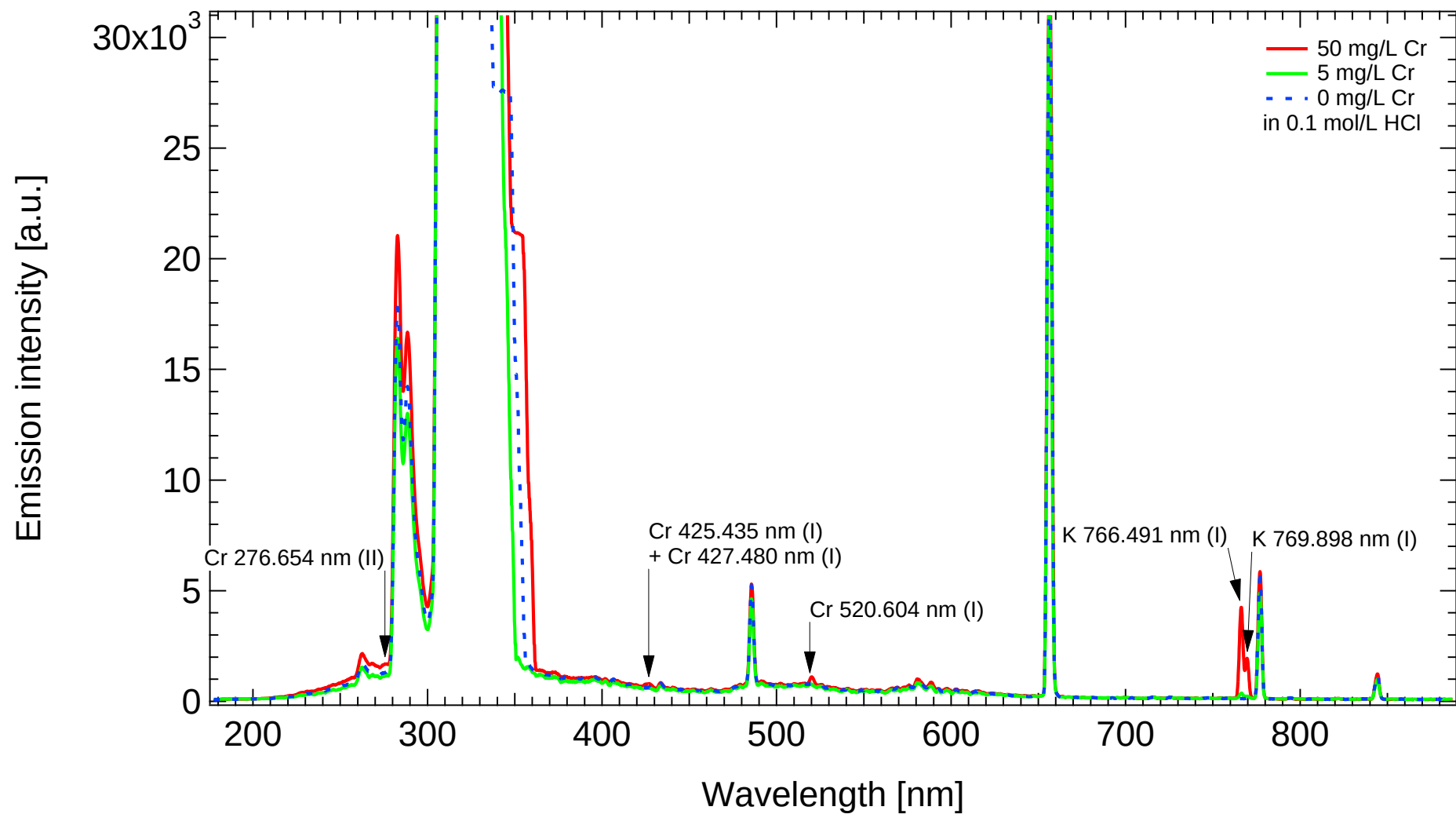
Spectra [T00090J]

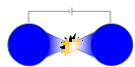
Cr

MH-5000 s2086

Conditions: 800 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses

LepiCuve-C





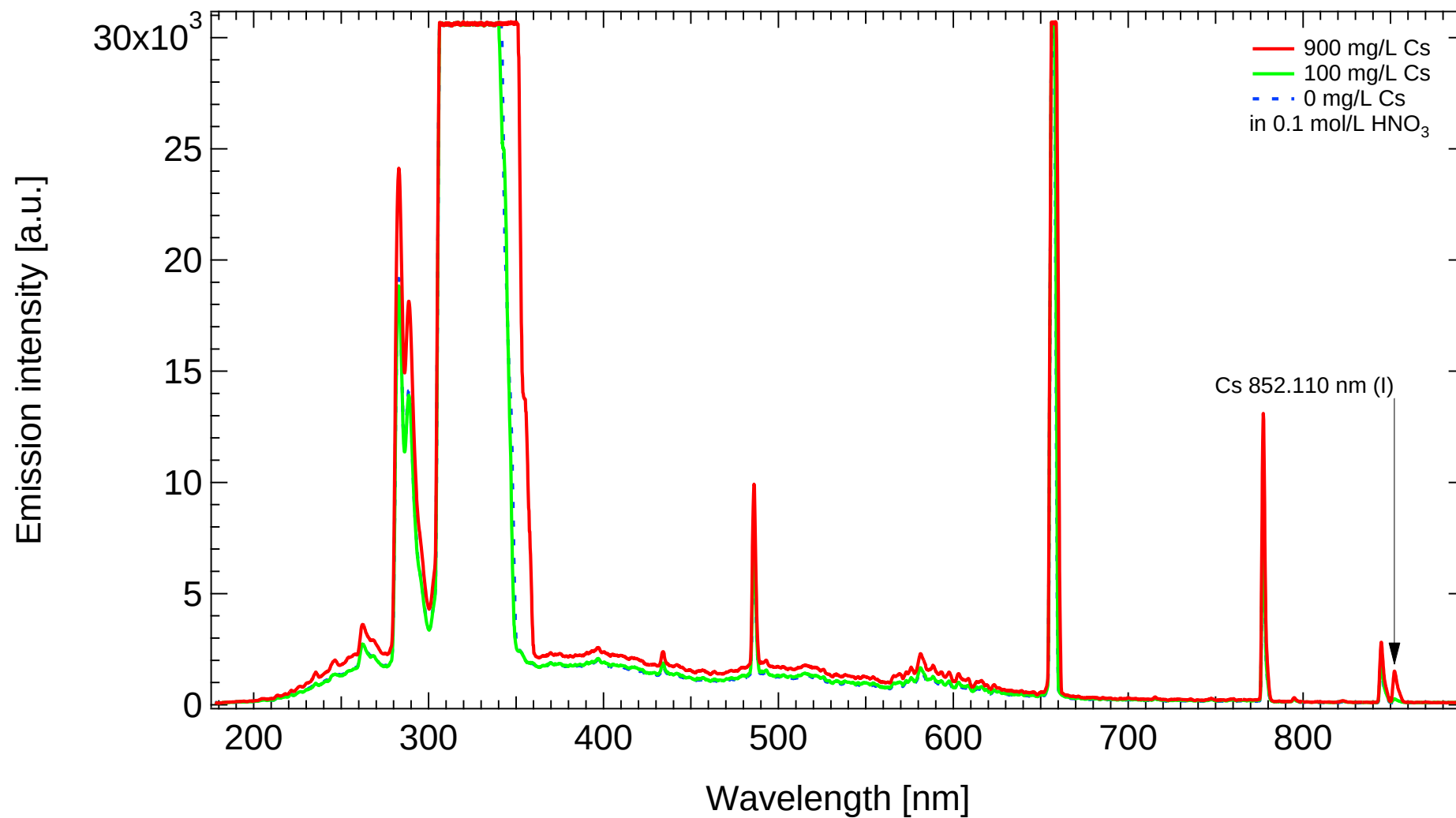
Spectra [T00090J]

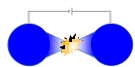
Cs

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 40 pulses

LepiCuve-C





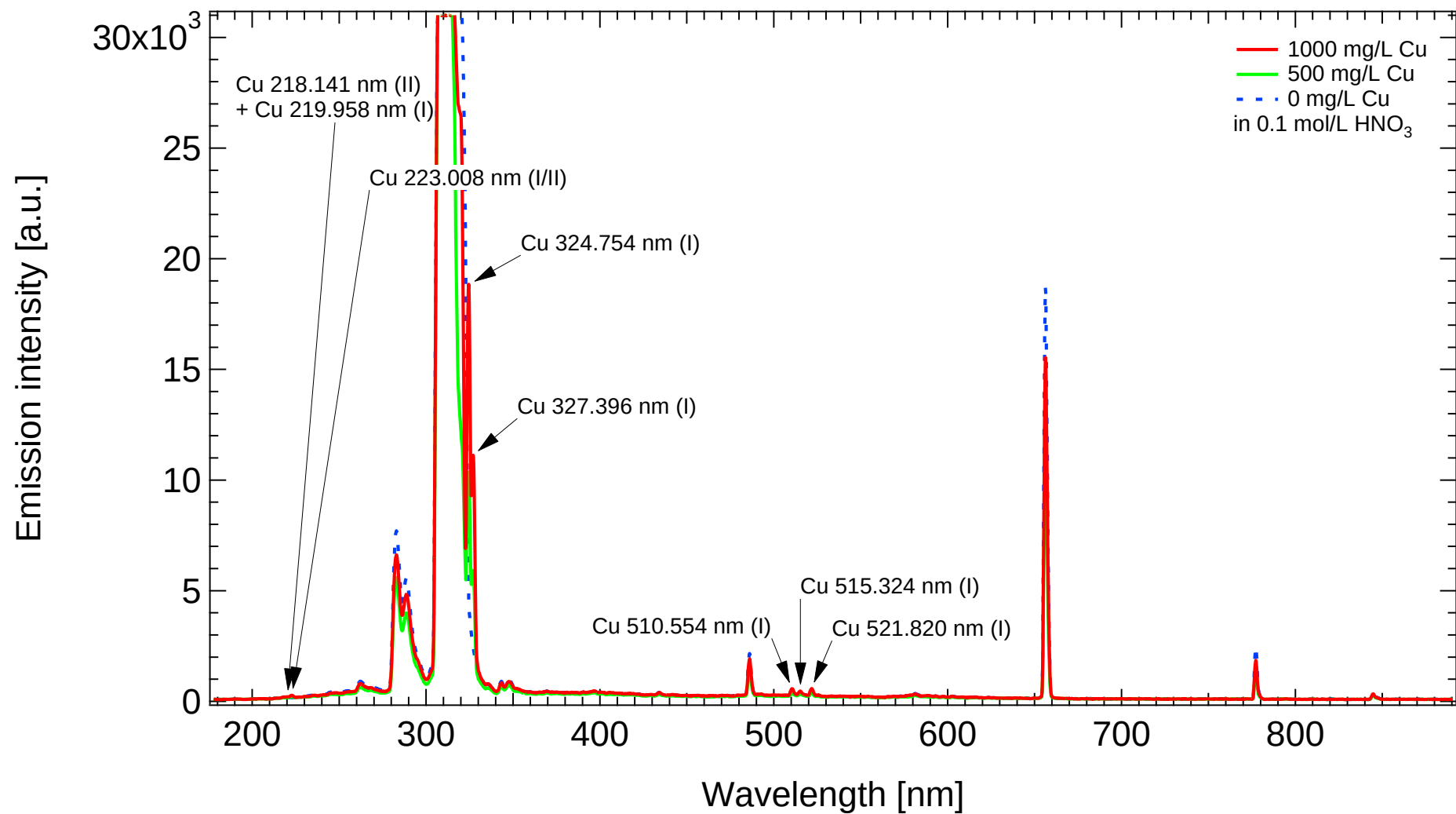
Spectra [T00090J]

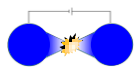
Cu

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 10 pulses

LepiCuve-C





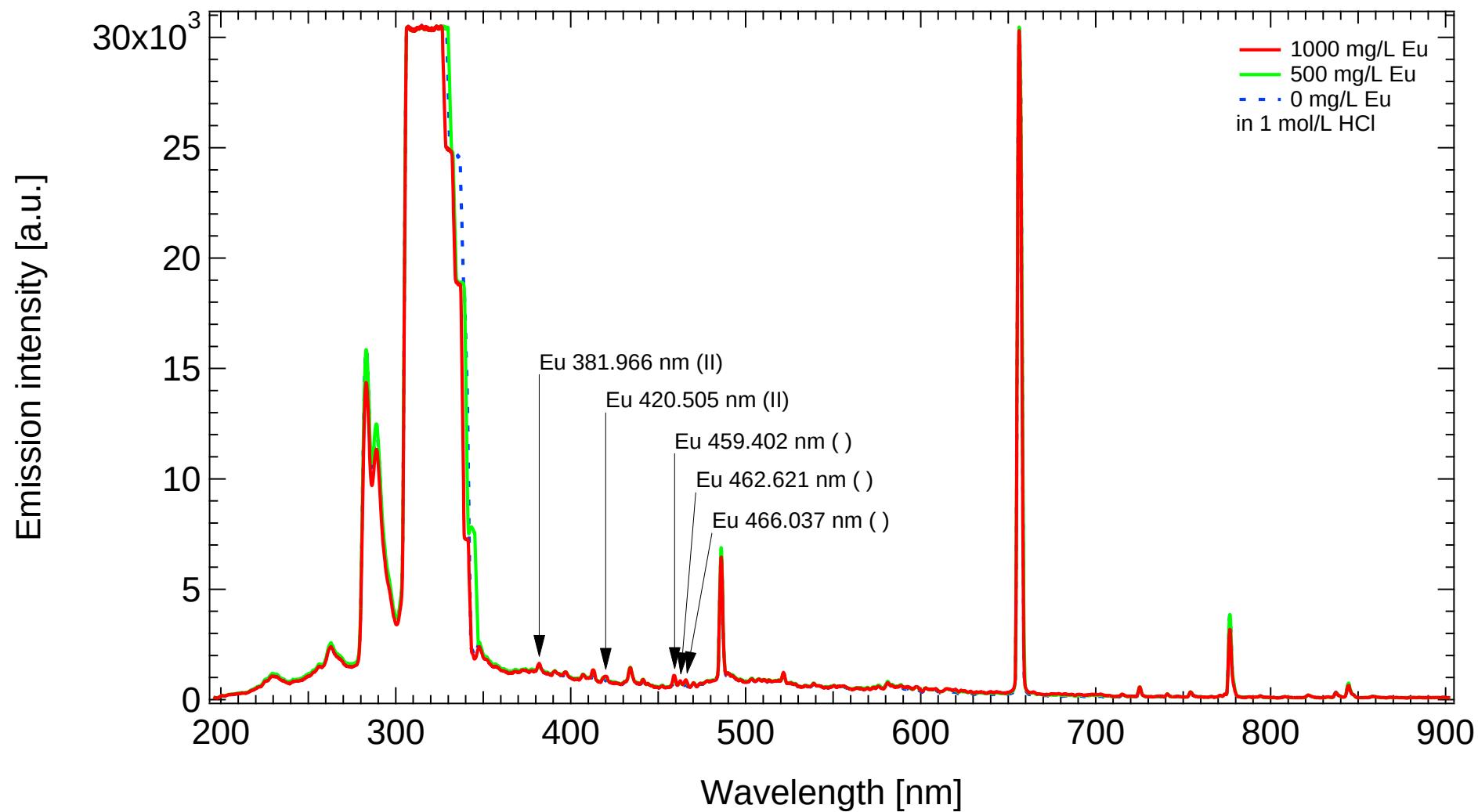
Spectra [T00090J]

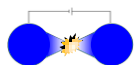
Eu

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses

LepiCuve-C





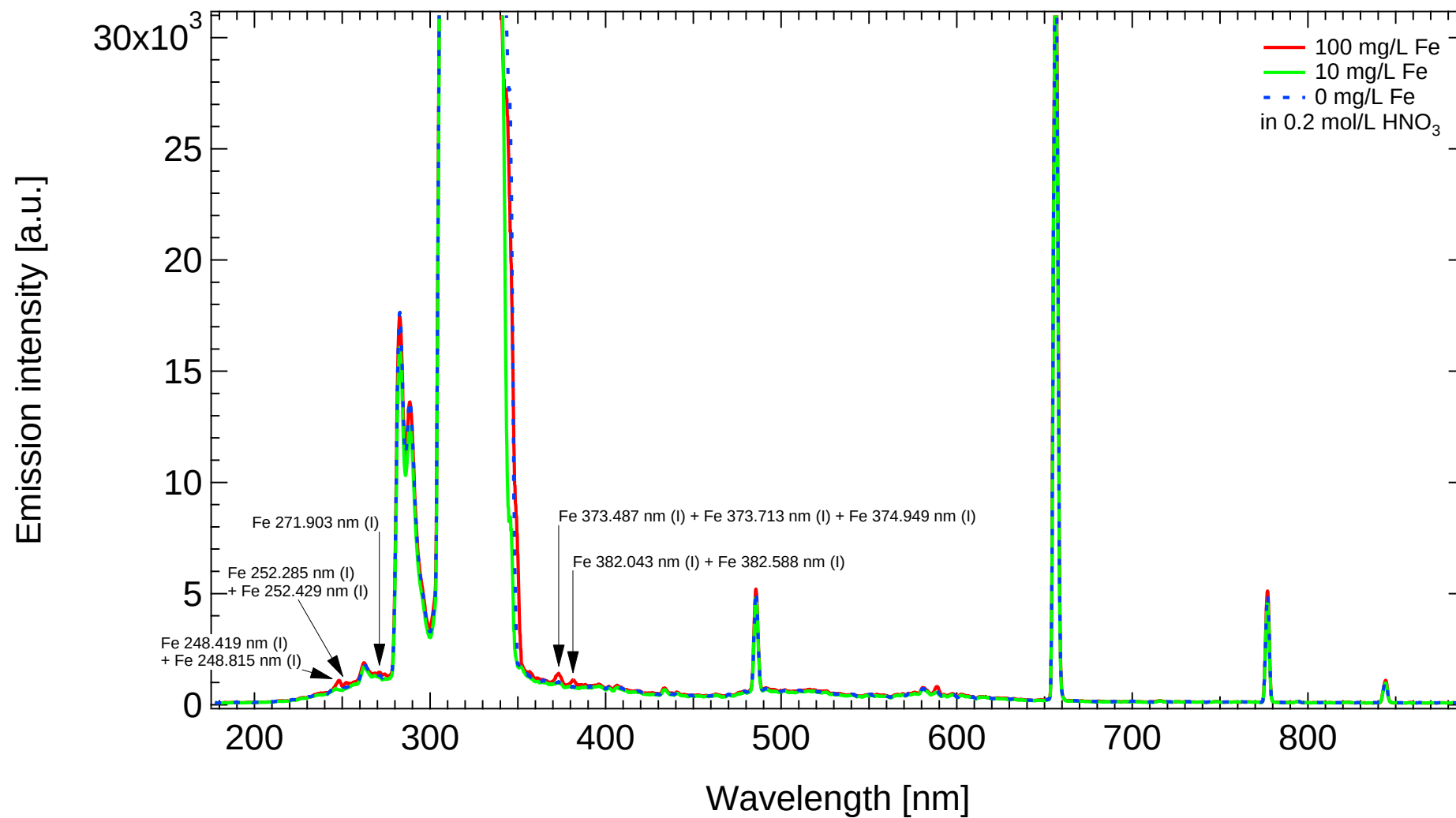
Spectra [T00090J]

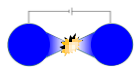
Fe

MH-5000 s2086

LepiCuvé-C

Conditions: 750 V, (ON: 2 ms / OFF: 80 ms) × 20 pulses





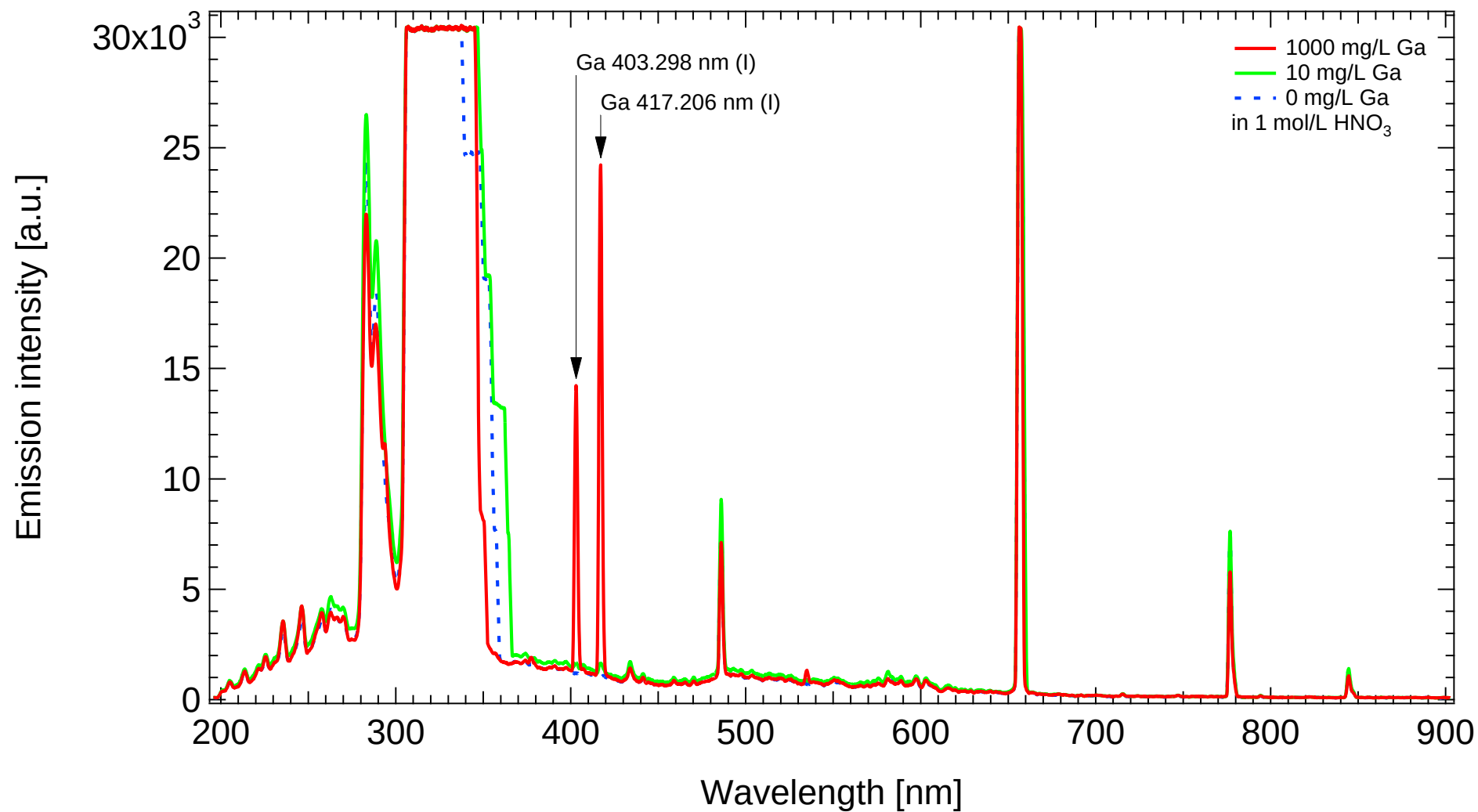
Spectra [T00090J]

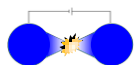
Ga

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses

LepiCuve-C





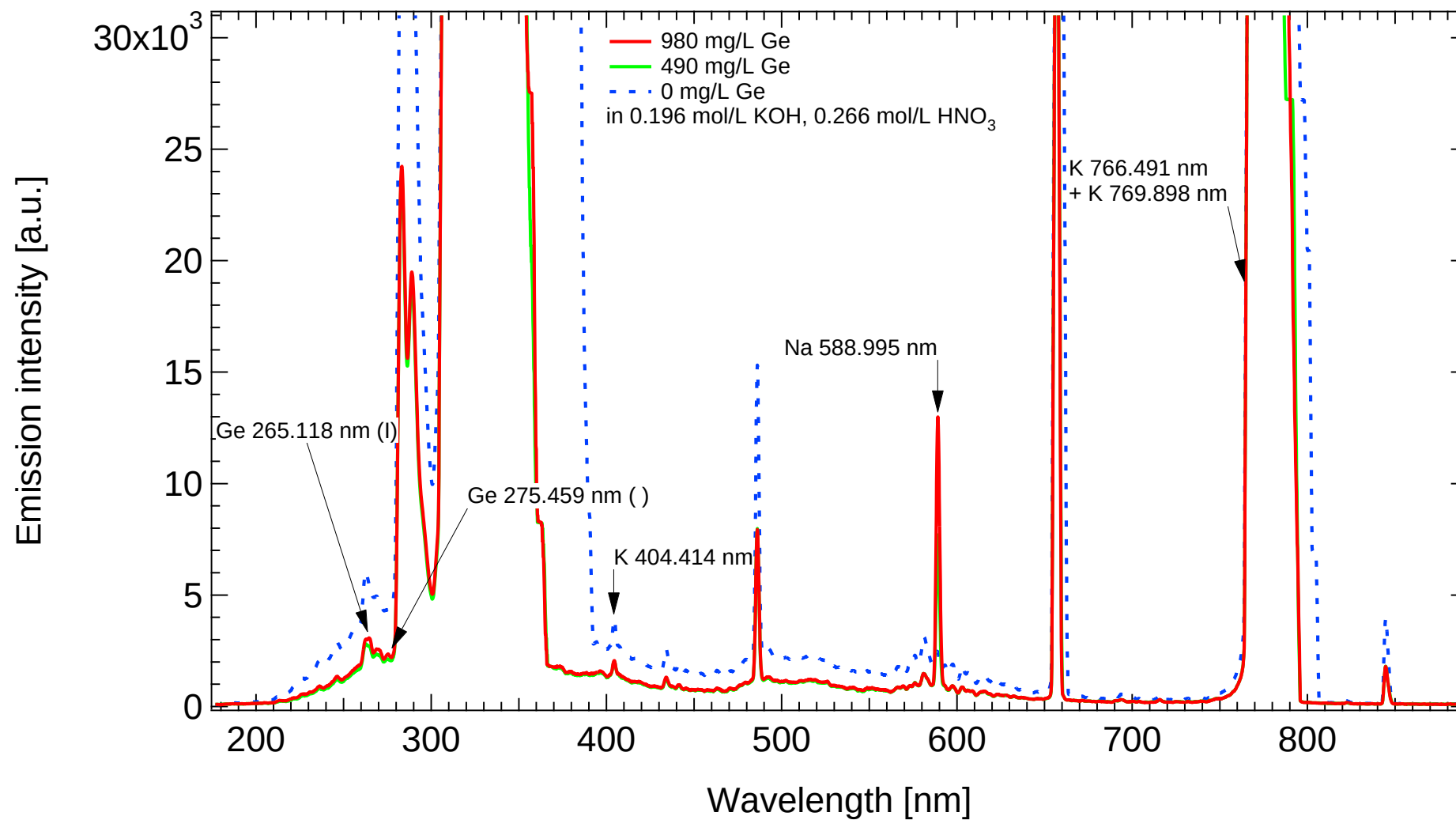
Spectra [T00090J]

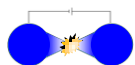
Ge

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 50 ms) × 20 pulses

LepiCuve-C



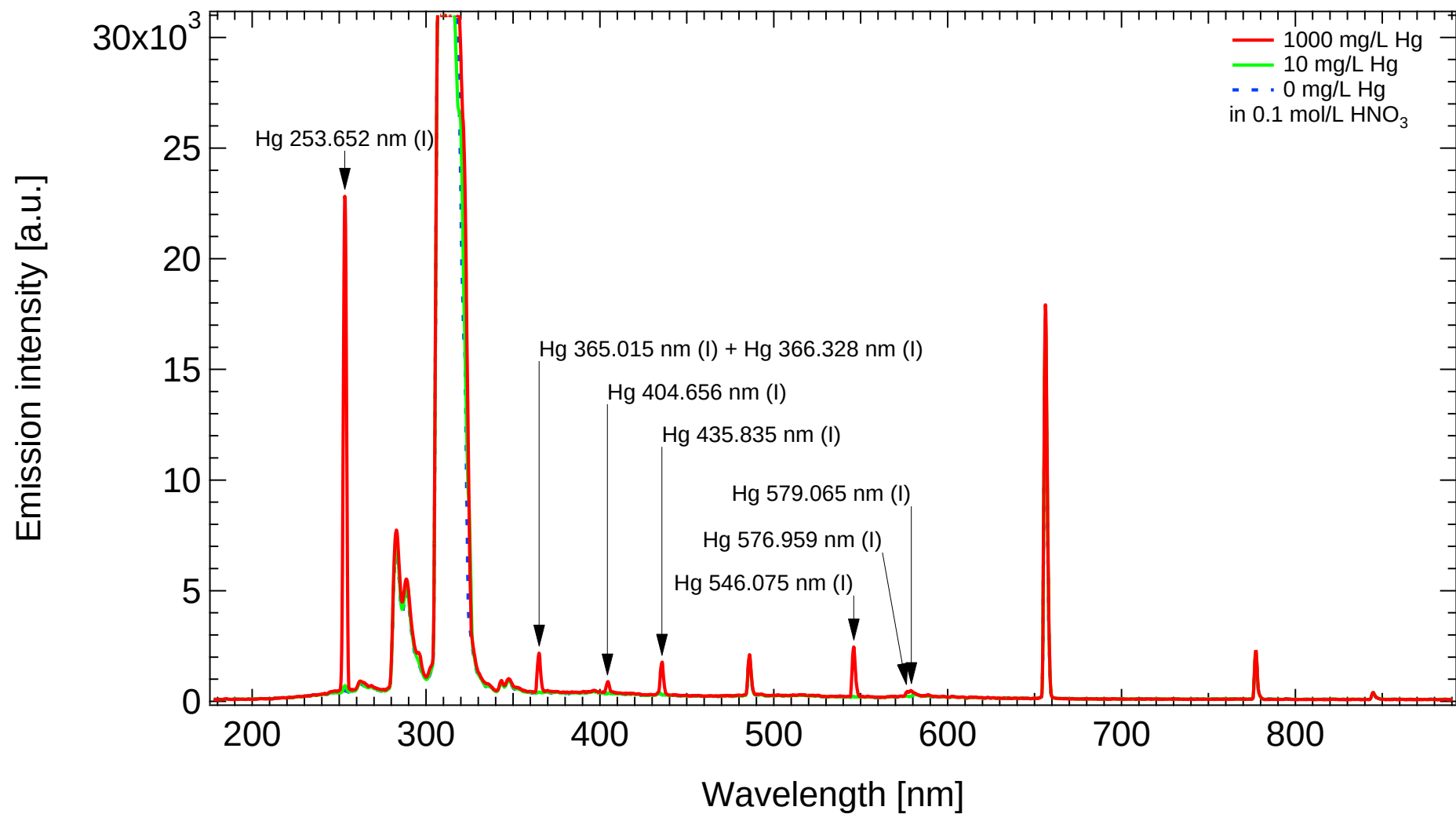


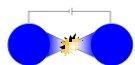
Hg

MH-5000 s2086

LepiCuve-C

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 10 pulses

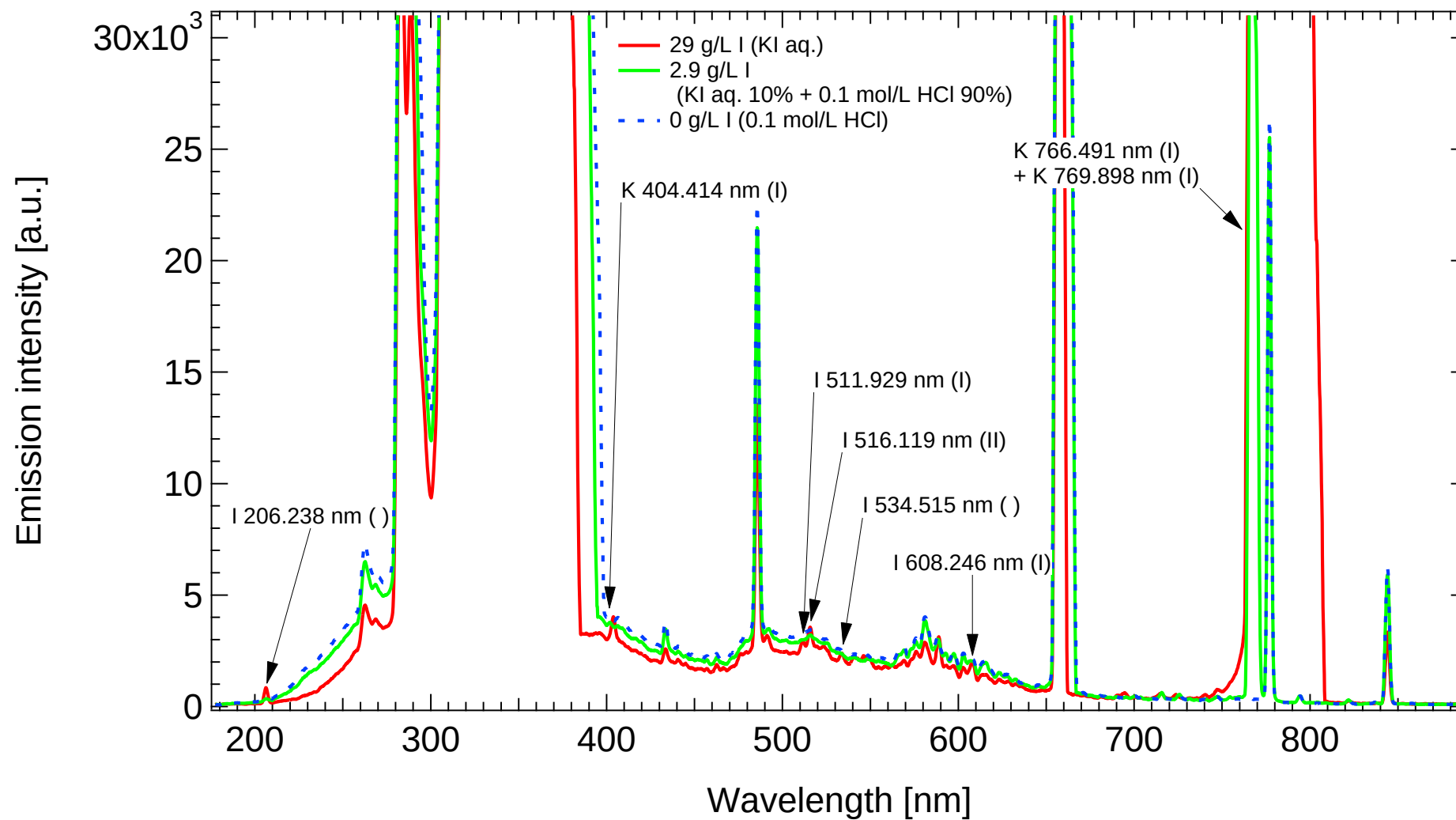


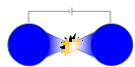


MH-5000 s2086

Conditions: 850 V, (ON: 2 ms / OFF: 40 ms) × 40 pulses

LepiCuve-C





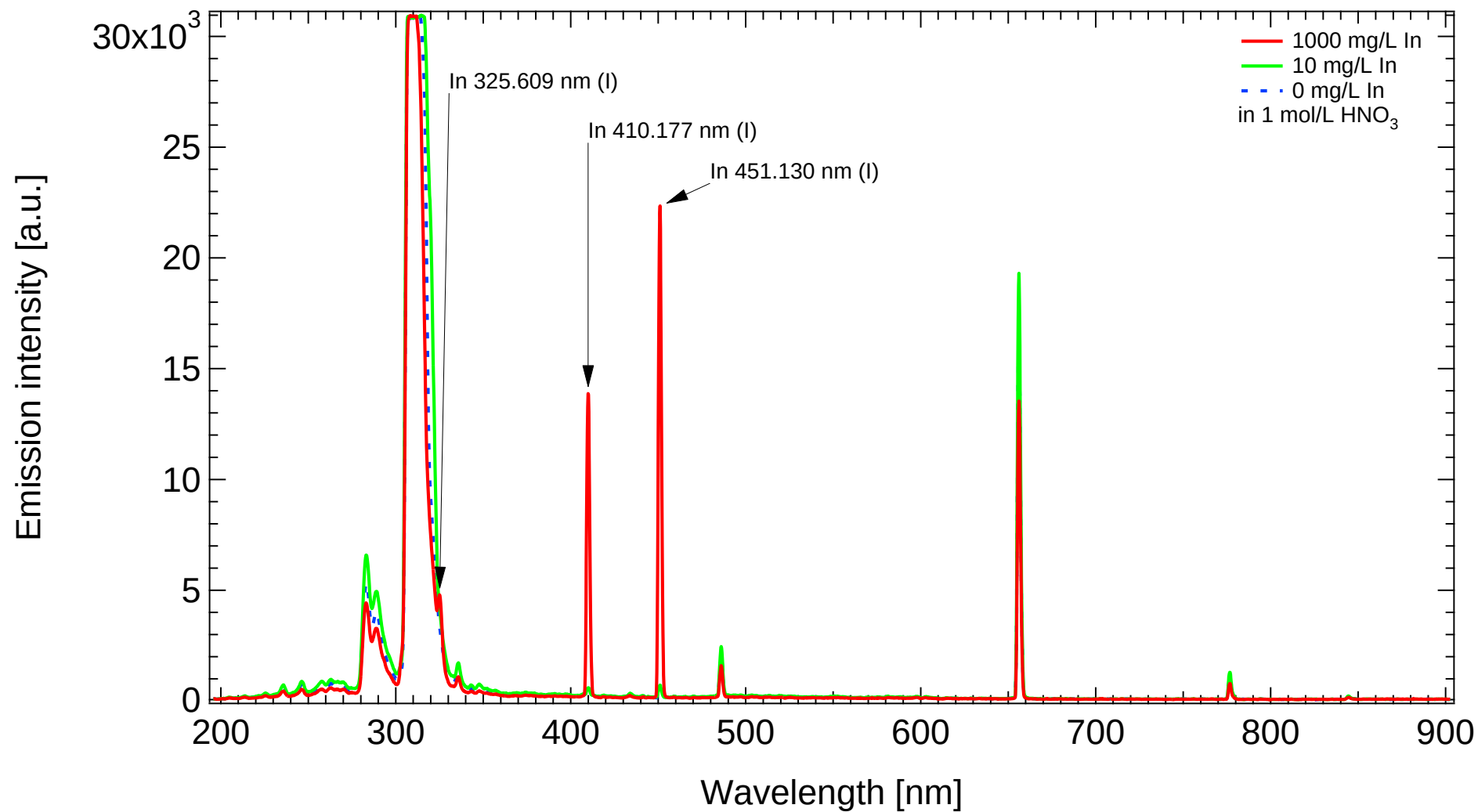
Spectra [T00090J]

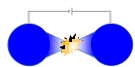
In

MH-5000 s2086

Conditions: 600 V, (ON: 2 ms / OFF: 60 ms) × 10 pulses

LepiCuve-C





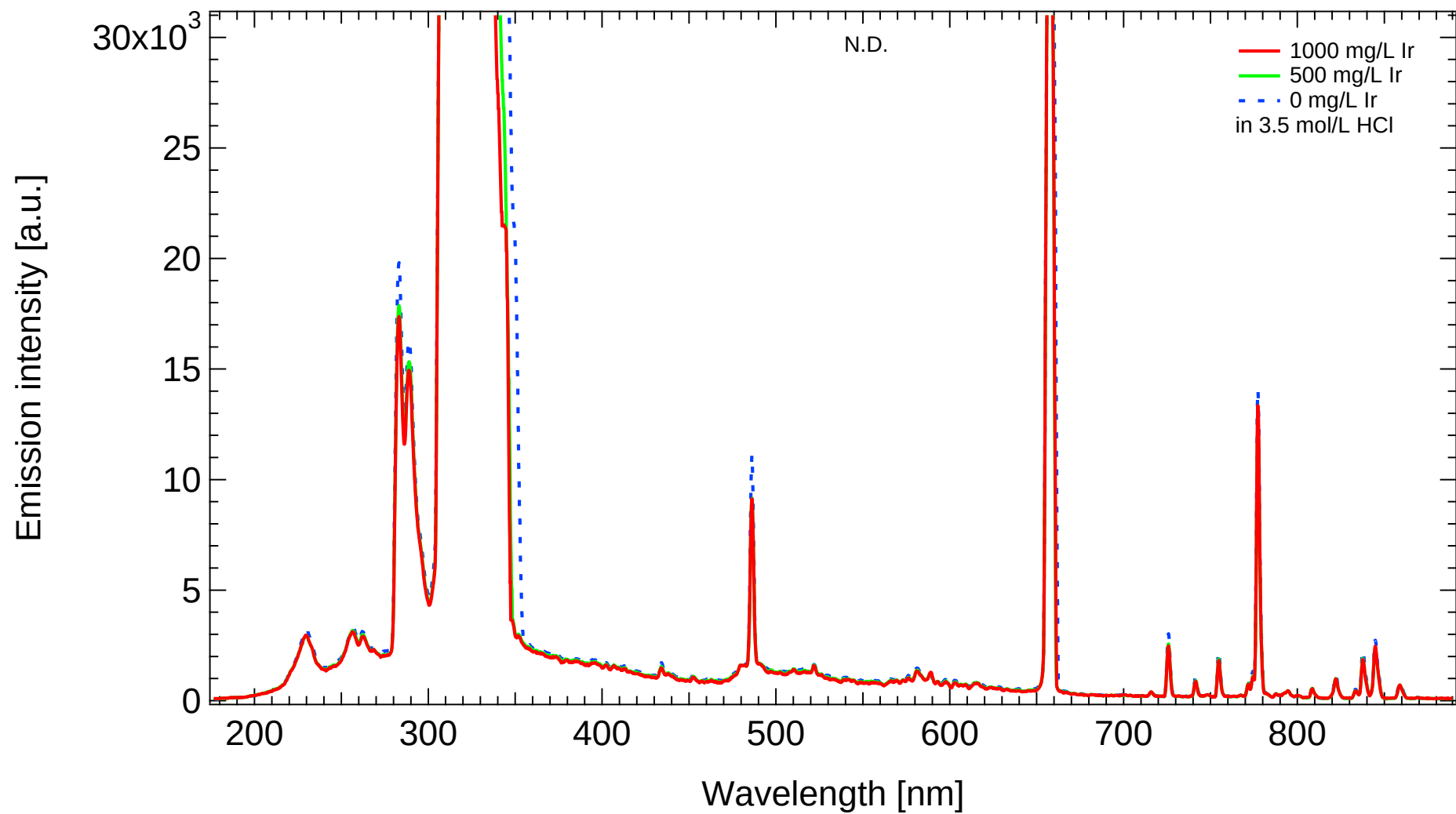
Spectra [T00090J]

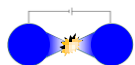
Ir

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 110 ms) × 20 pulses

LepiCuve-C





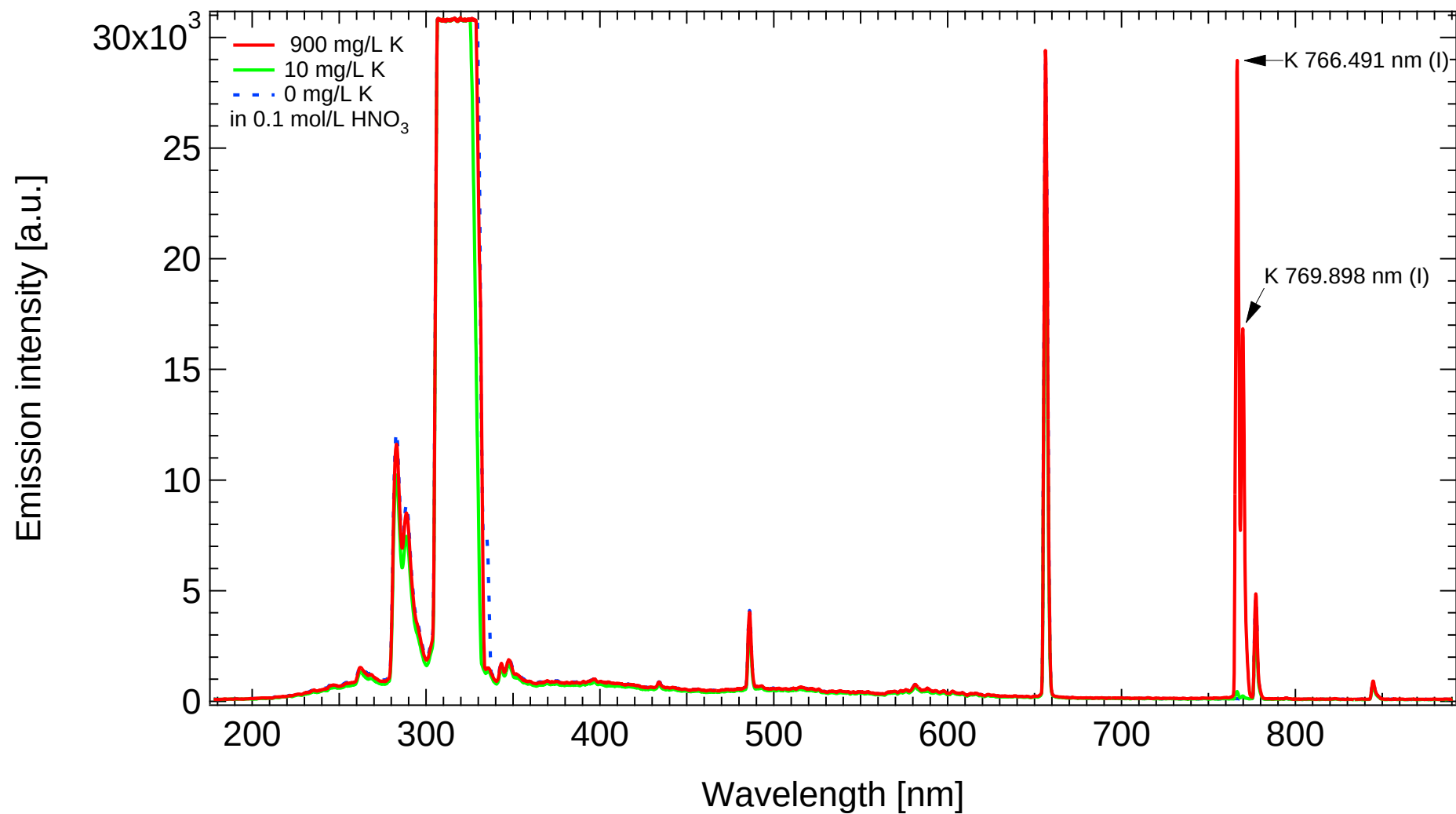
Spectra [T00090J]

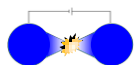
K

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 20 pulses

LepiCuve-C

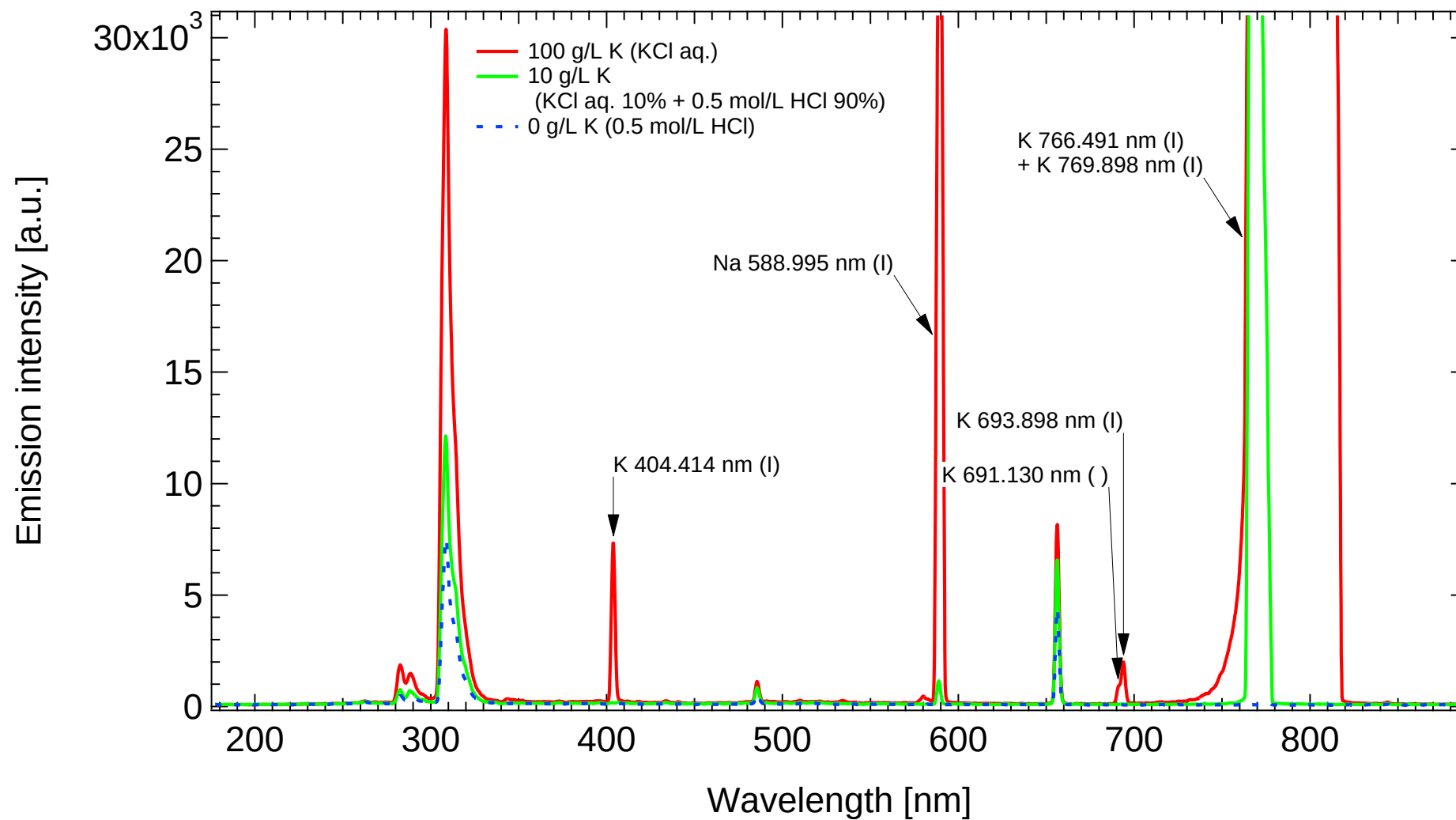


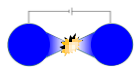
**K**

MH-5000 s2086

Conditions: 500 V, (ON: 2 ms / OFF: 50 ms) × 20 pulses

LepiCuve-C





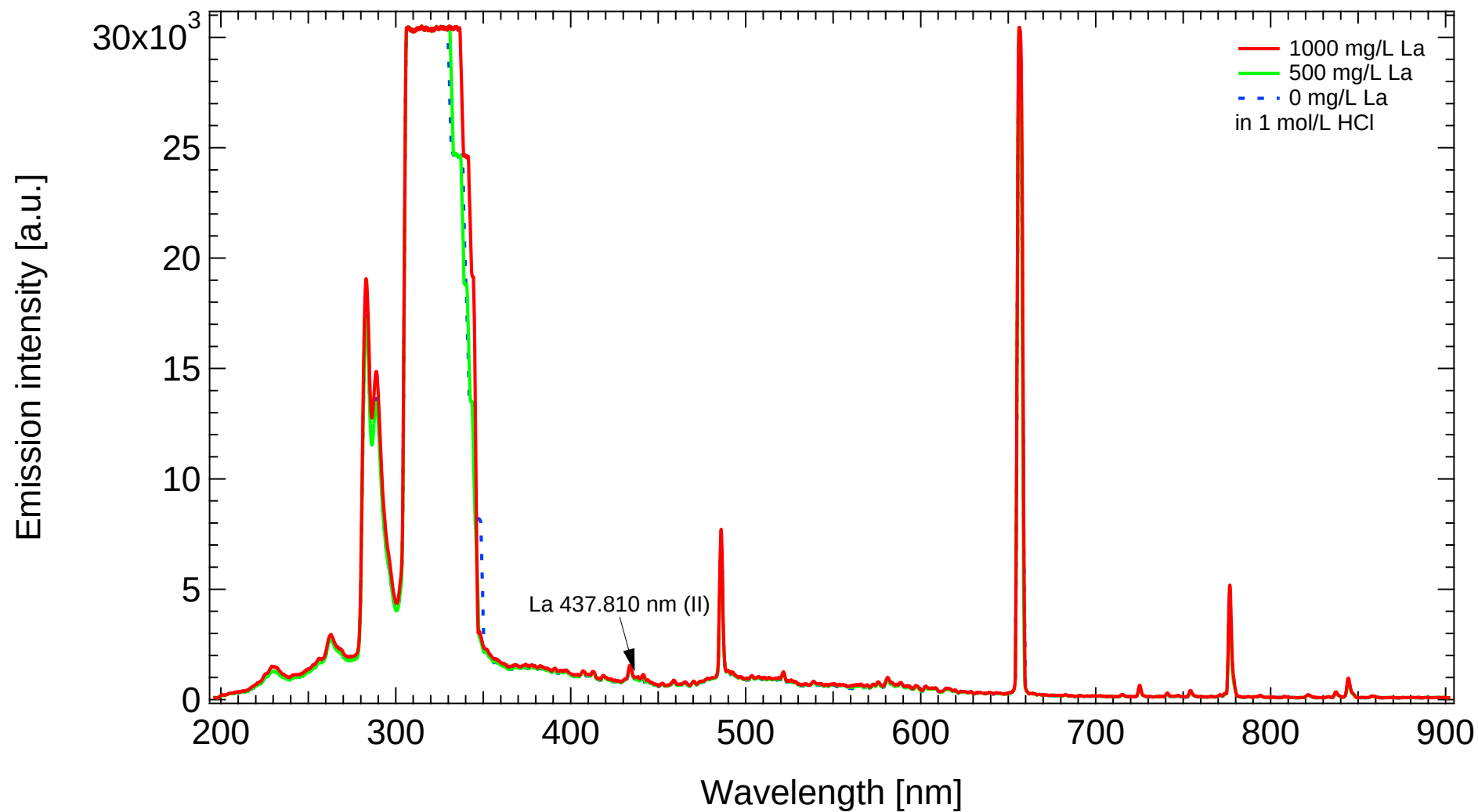
Spectra [T00090J]

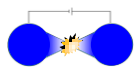
La

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses

LepiCuve-C





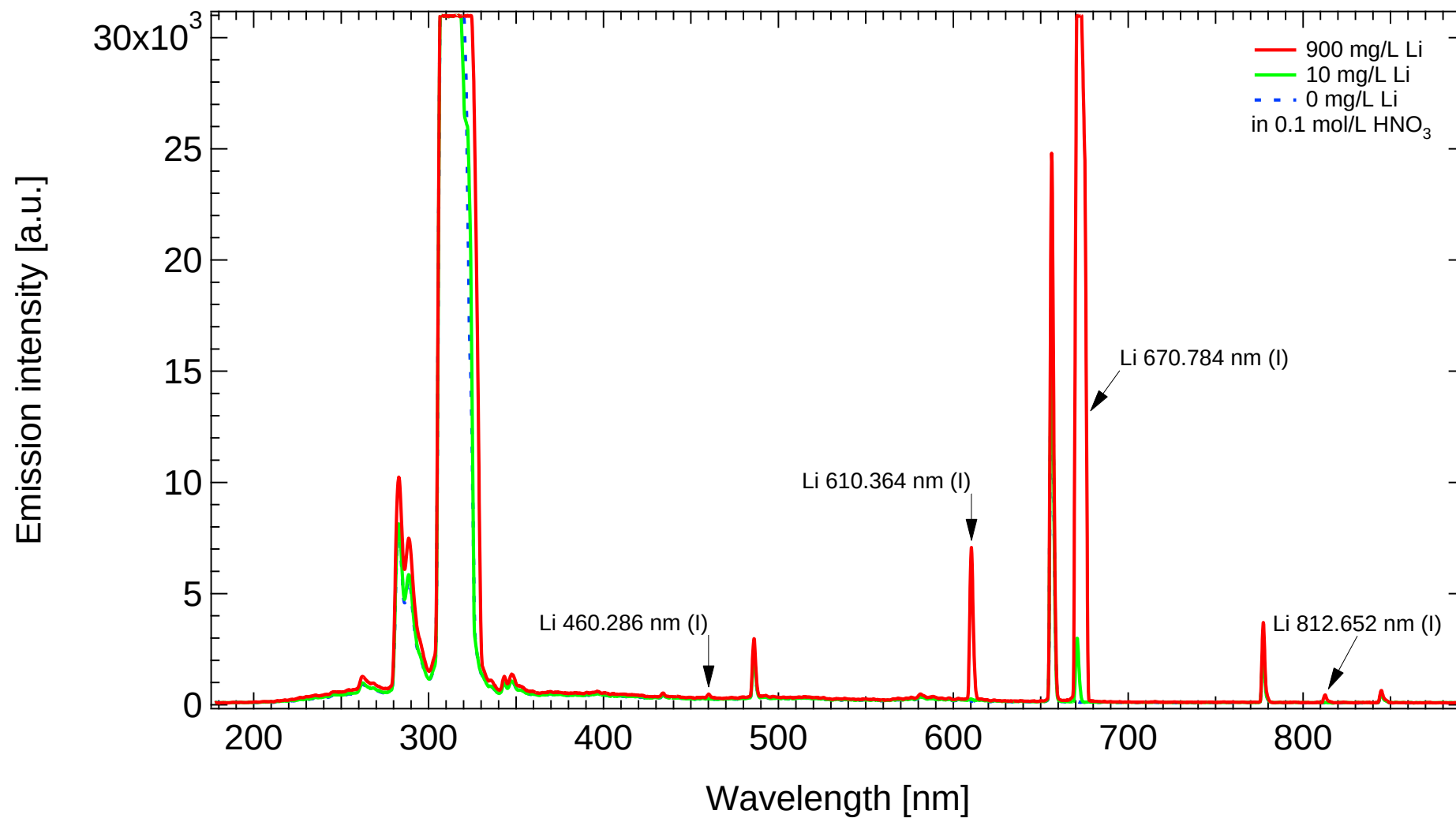
Spectra [T00090J]

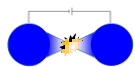
Li

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 10 pulses

LepiCuve-C





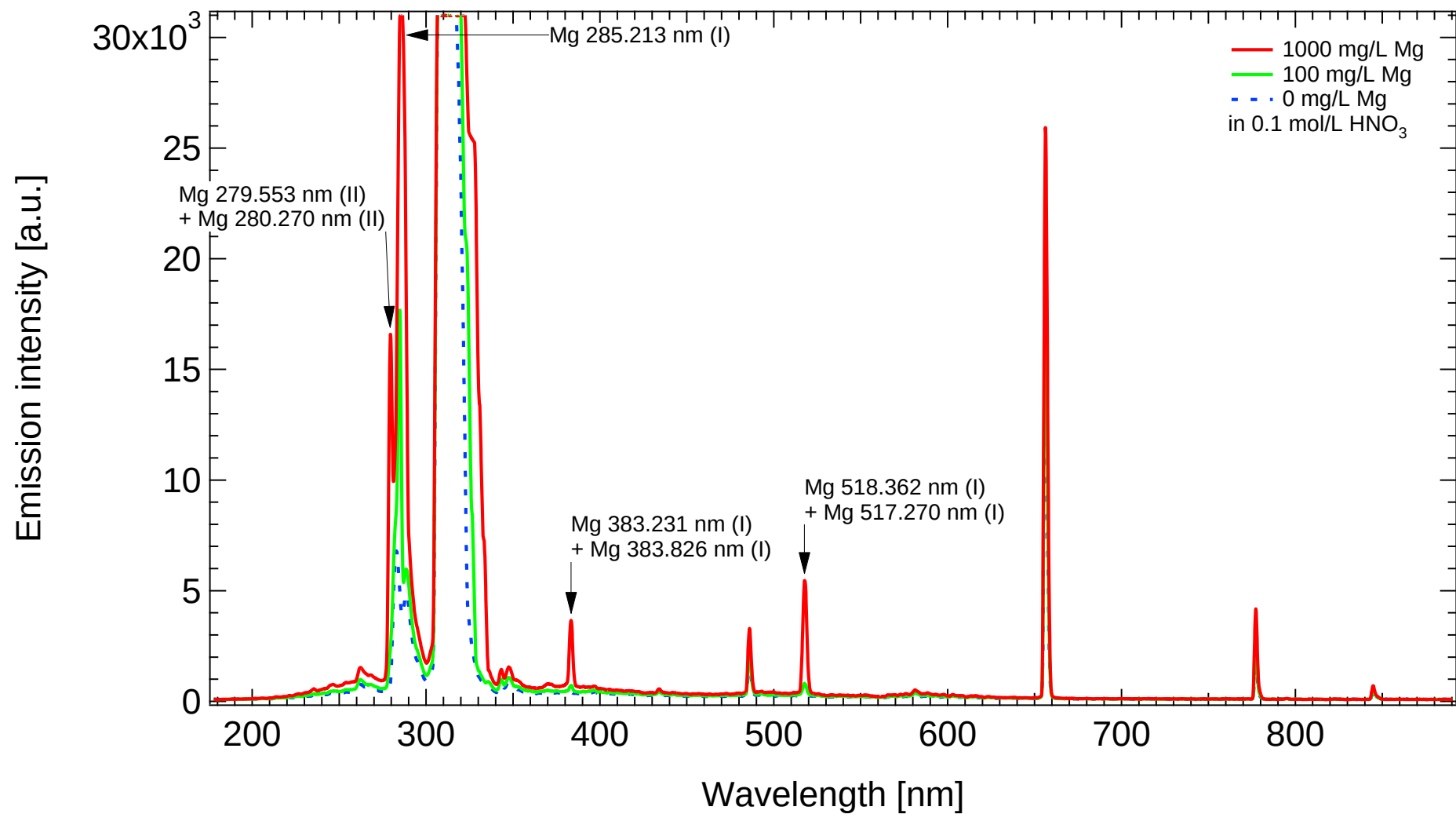
Spectra [T00090J]

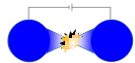
Mg

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 10 pulses

LepiCuve-C





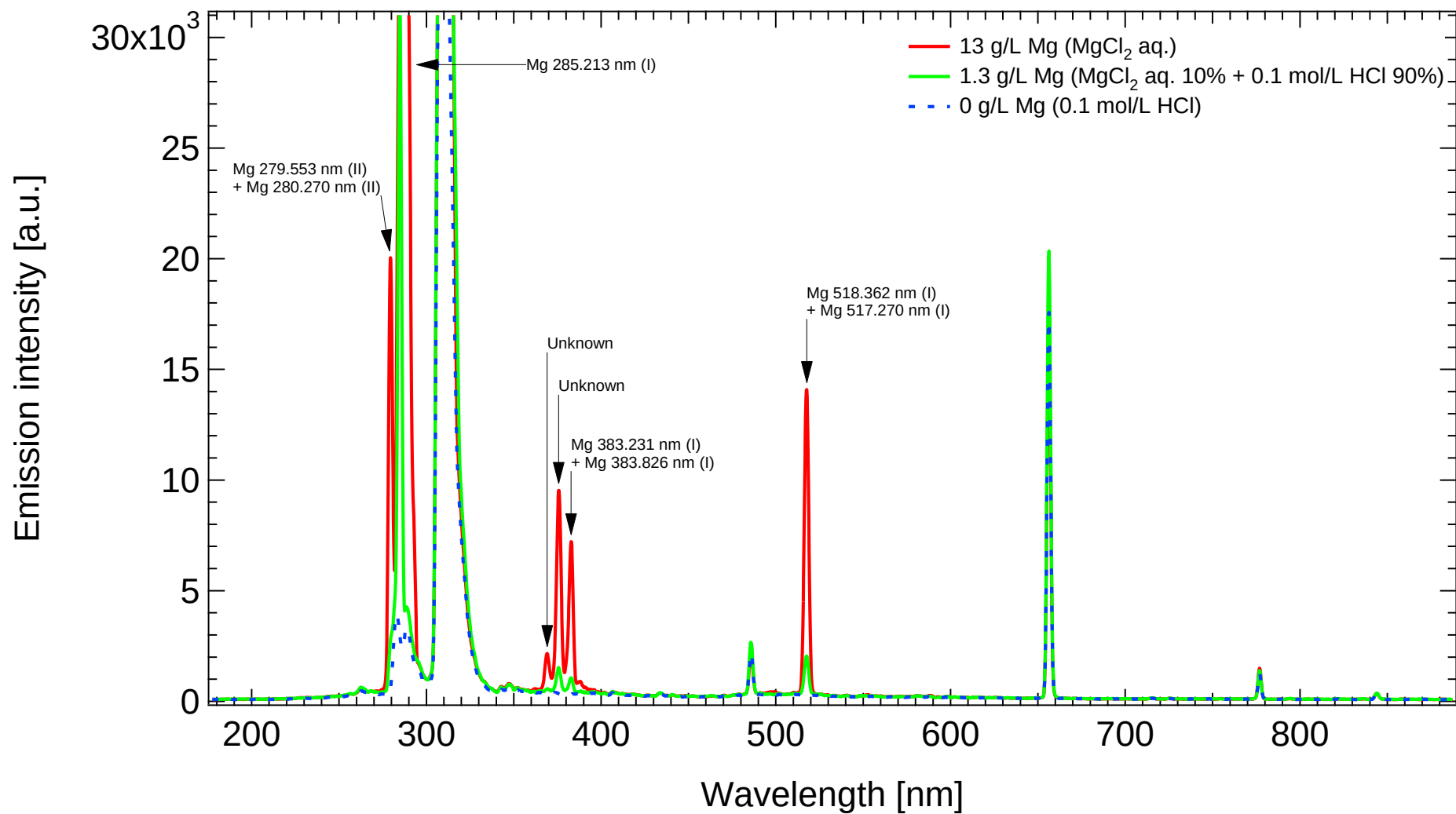
Spectra [T00090J]

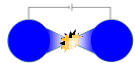
Mg

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 40 ms) × 40 pulses

LepiCuv-C





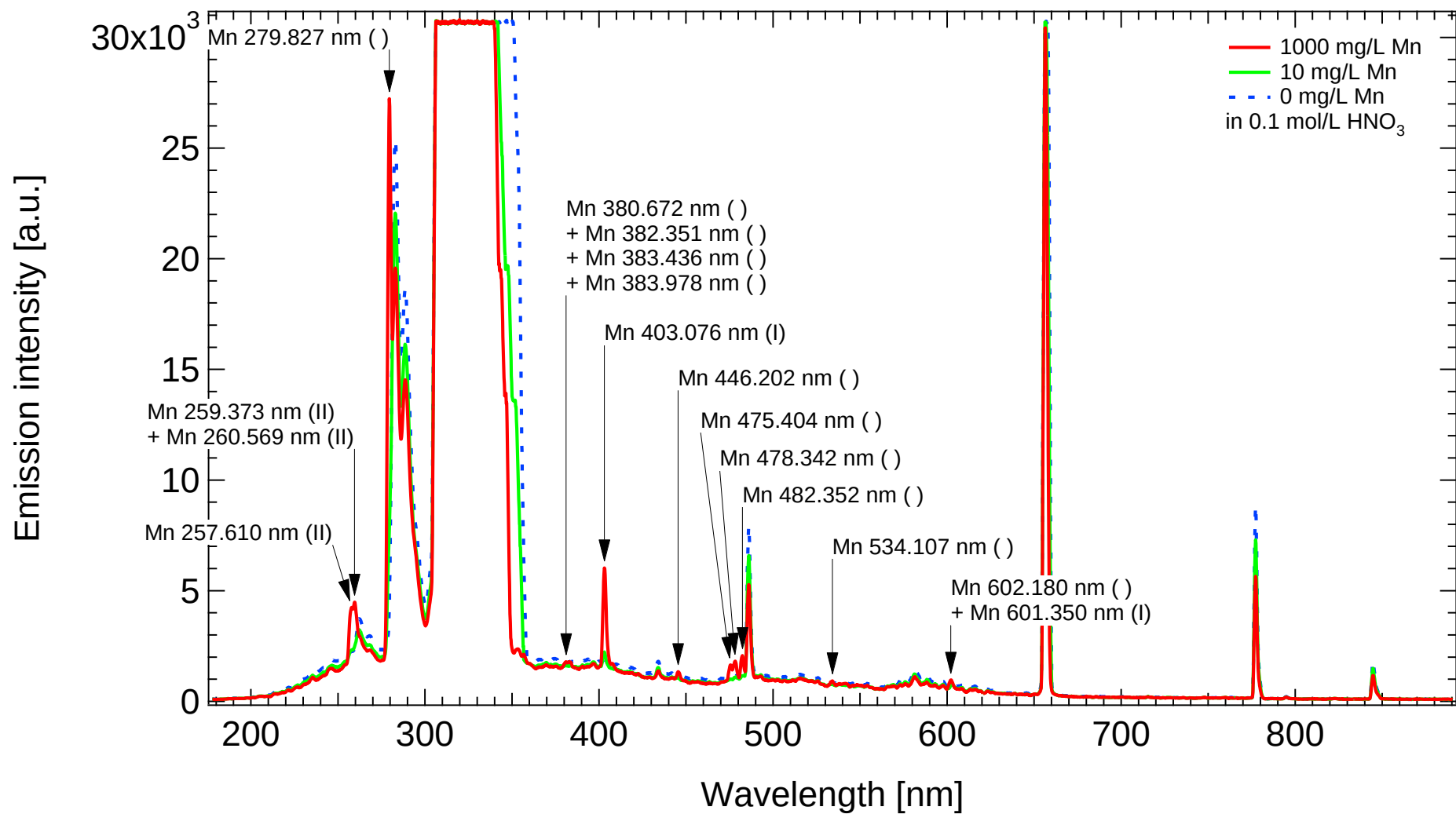
Spectra [T00090J]

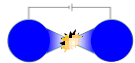
Mn

MH-5000 s2086

LepiCuve-C

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 30 pulses





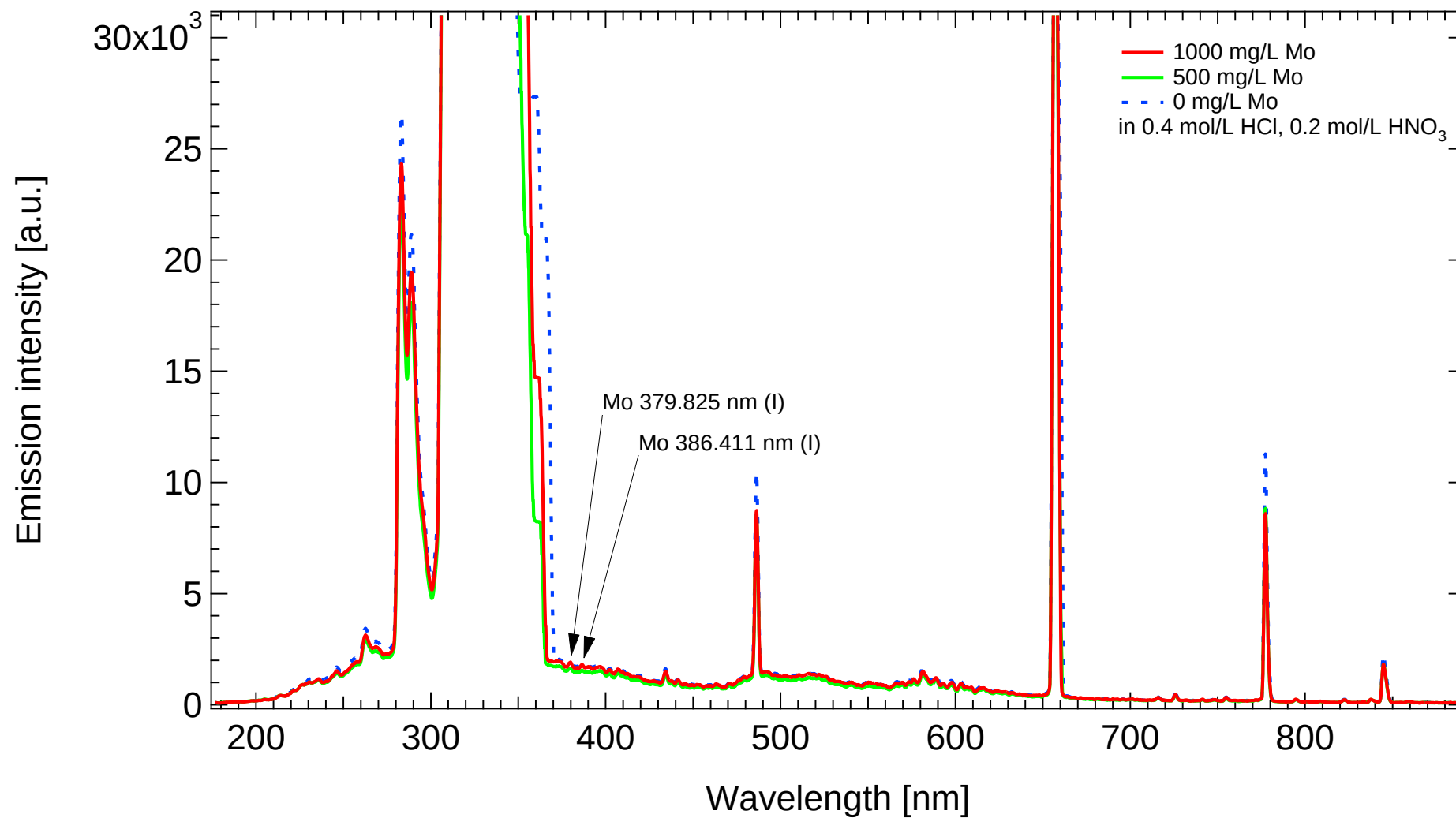
Spectra [T00090J]

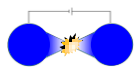
Mo

MH-5000 s2086

Conditions: 700 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses

LepiCuve-C





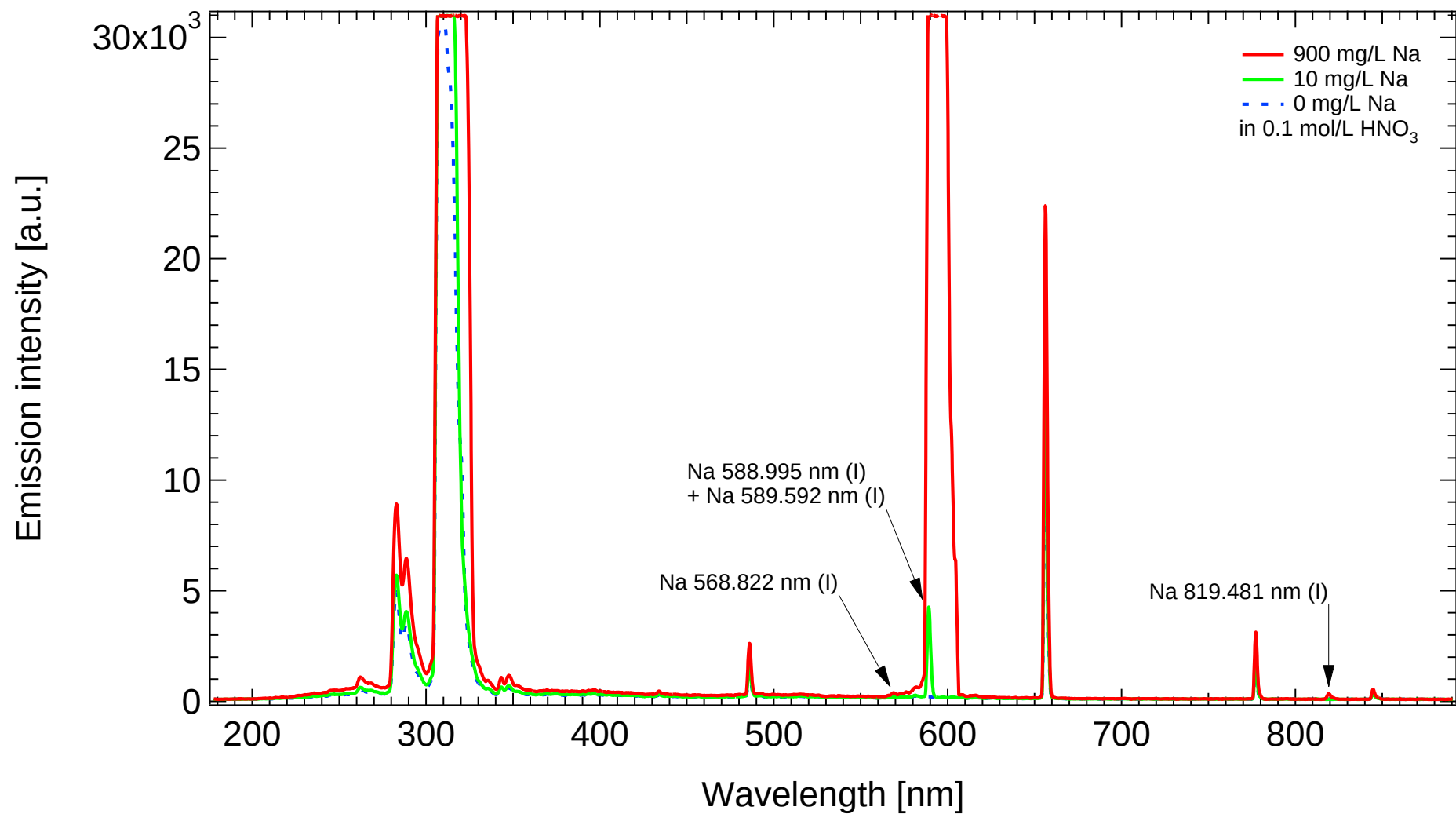
Spectra [T00090J]

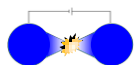
Na

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 10 pulses

LepiCuve-C



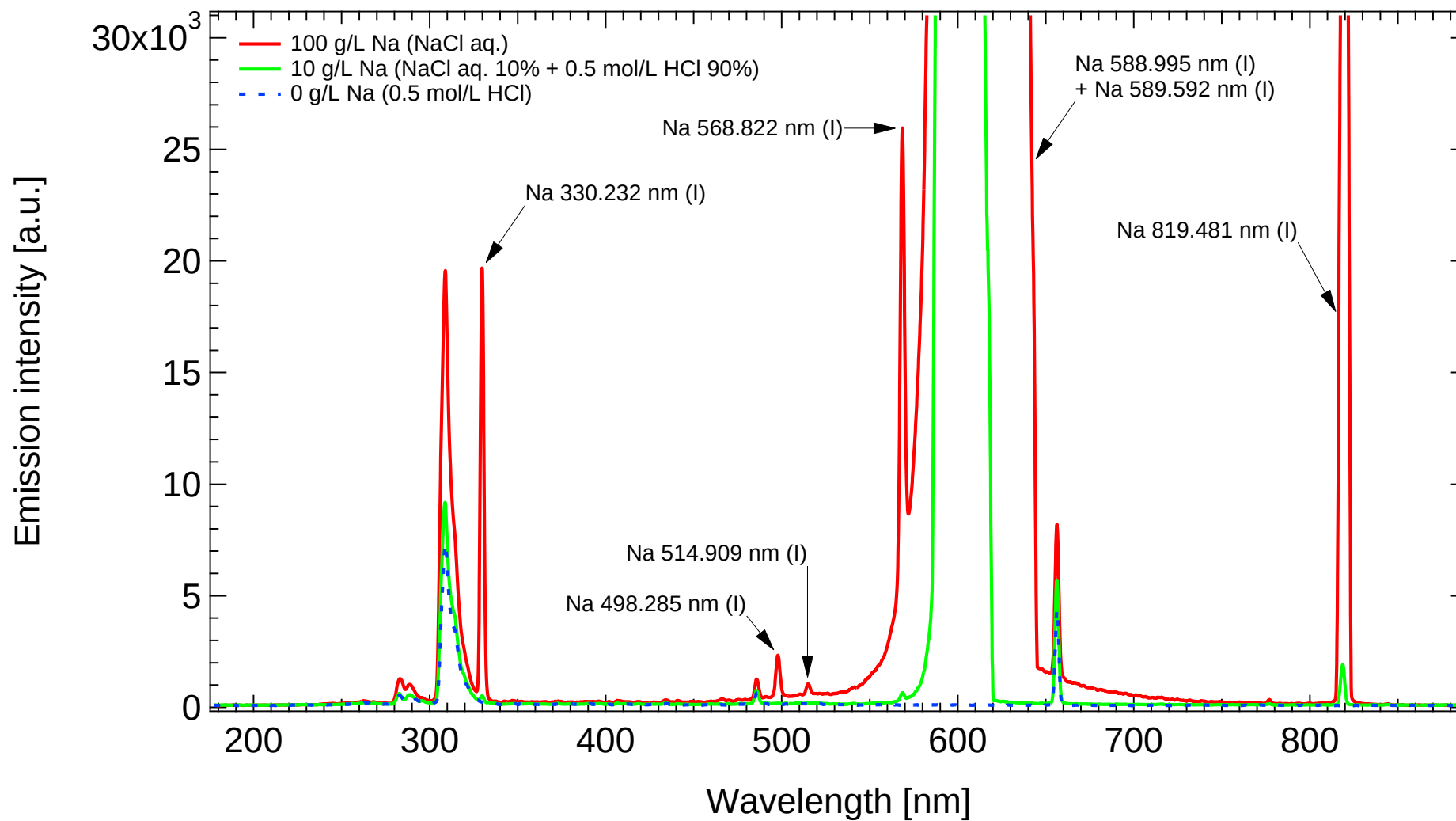


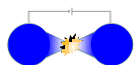
Na

MH-5000 s2086

Conditions: 500 V, (ON: 2 ms / OFF: 50 ms) × 20 pulses

LepiCuve-C





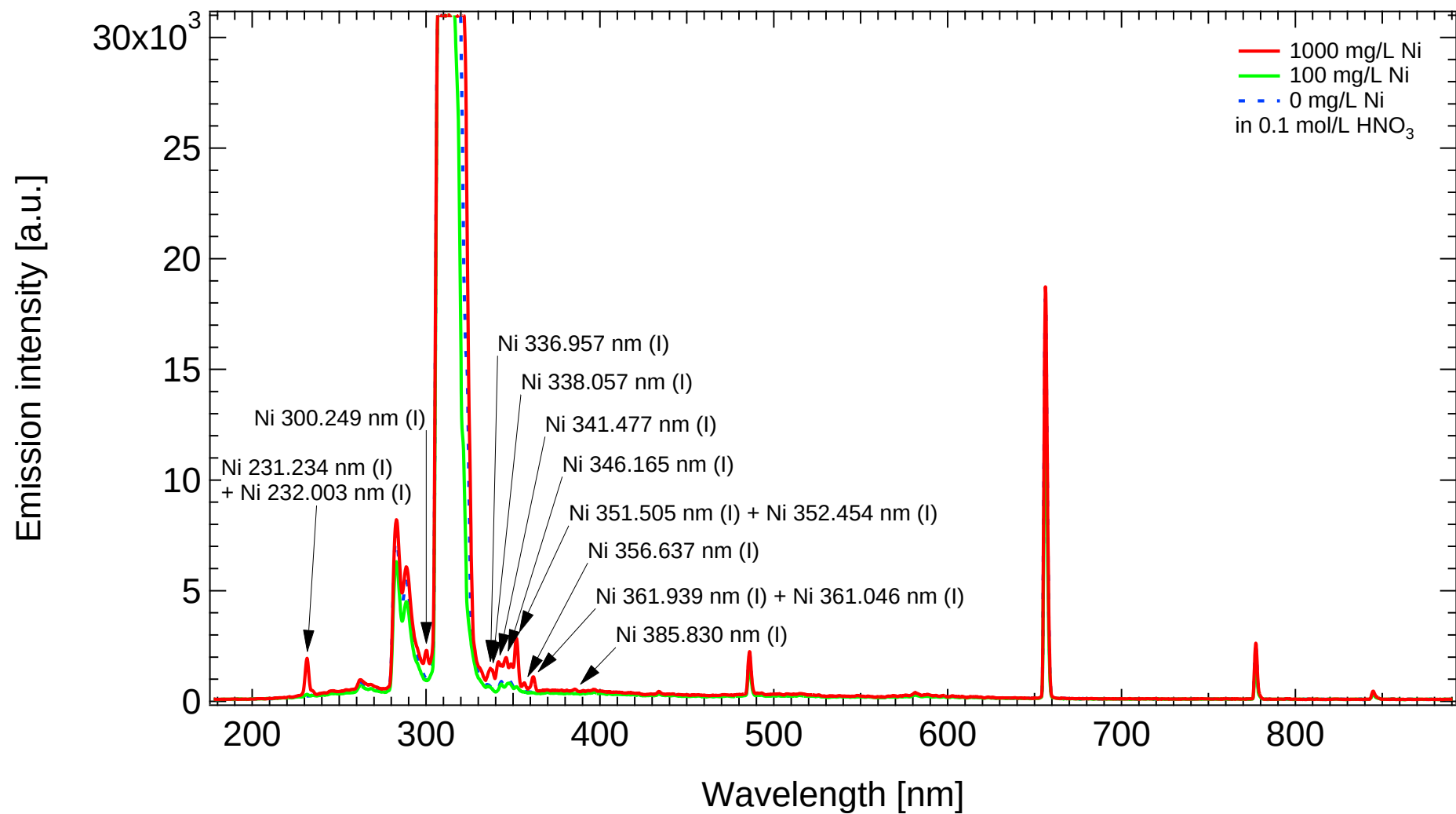
Spectra [T00090J]

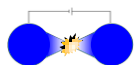
Ni

MH-5000 s2086

LepiCuvé-C

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 10 pulses

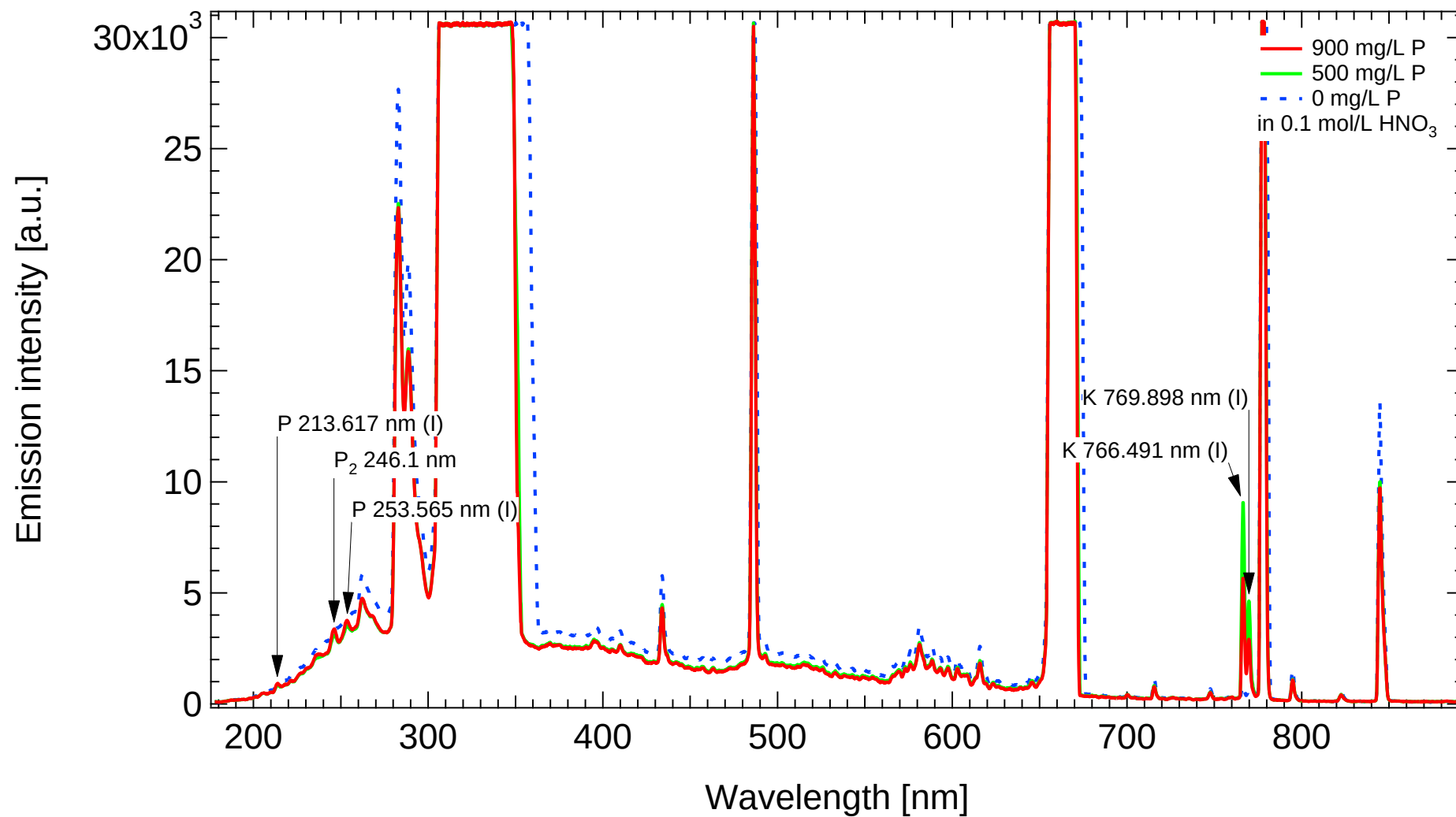


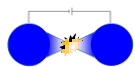
**P**

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 40 pulses

LepiCuve-C





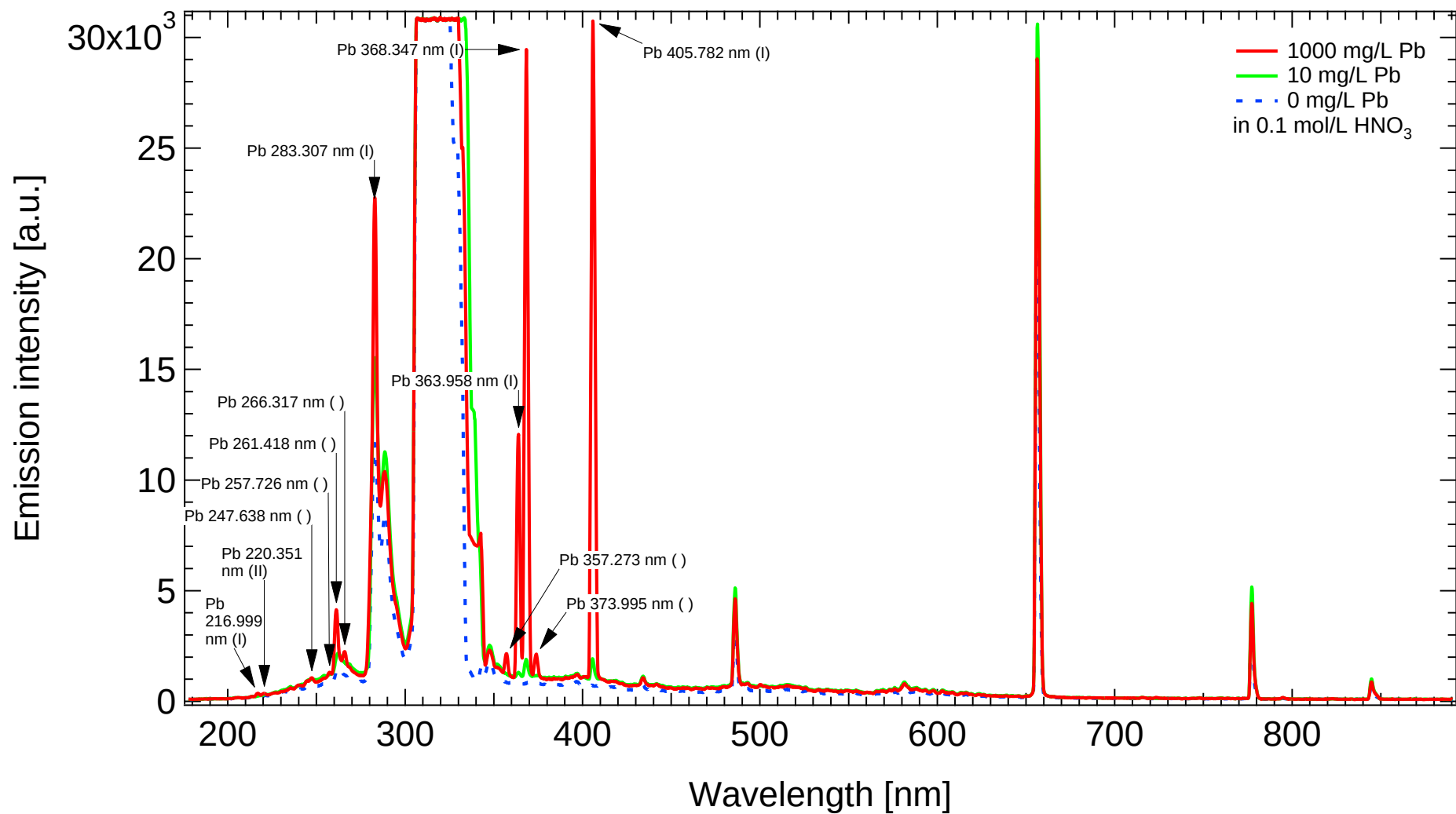
Spectra [T00090J]

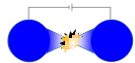
Pb

MH-5000 s2086

LepiCuvé-C

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 20 pulses





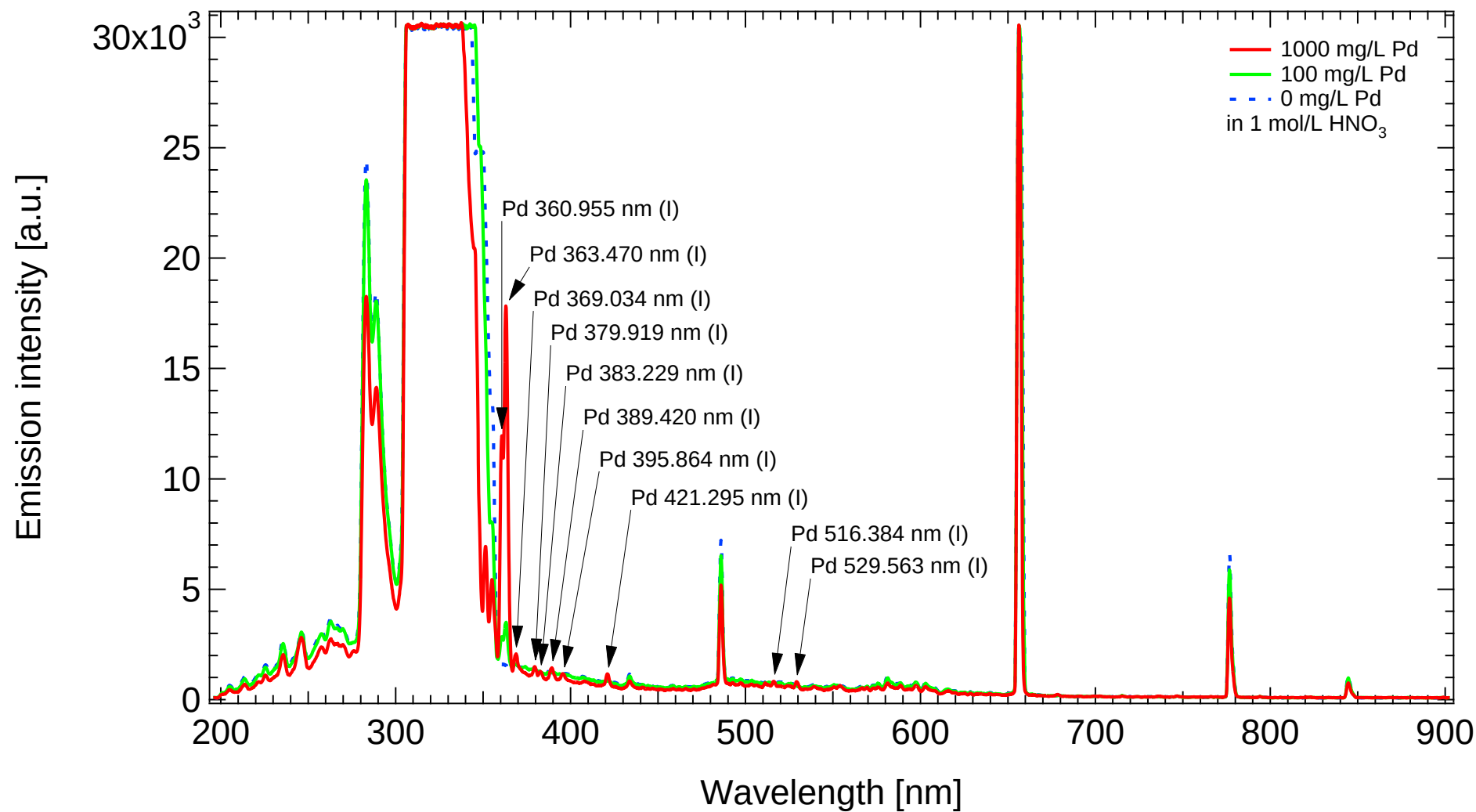
Spectra [T00090J]

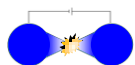
Pd

MH-5000 s2086

LepiCuve-C

Conditions: 650 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses





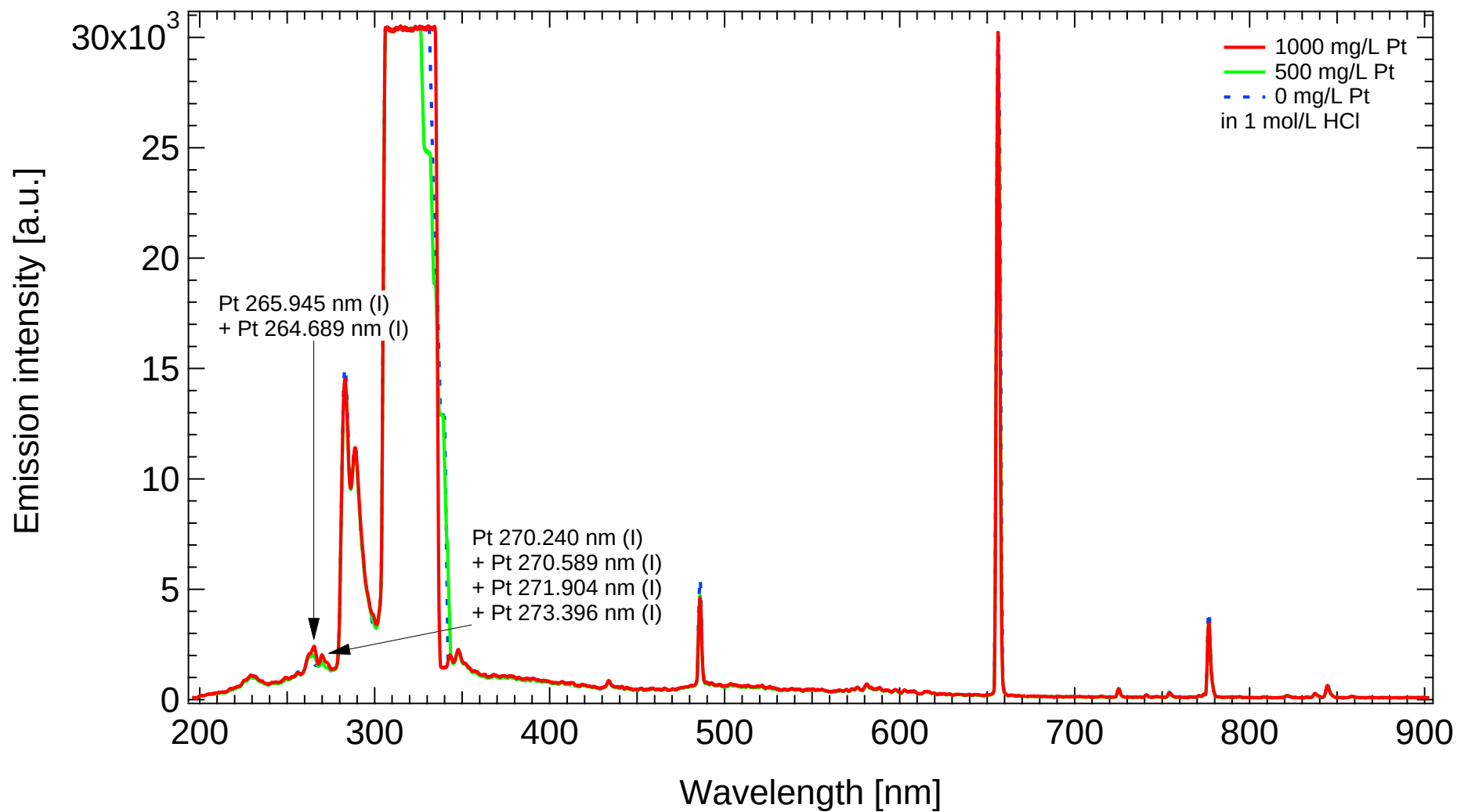
Spectra [T00090J]

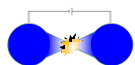
Pt

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses

LepiCuv-C

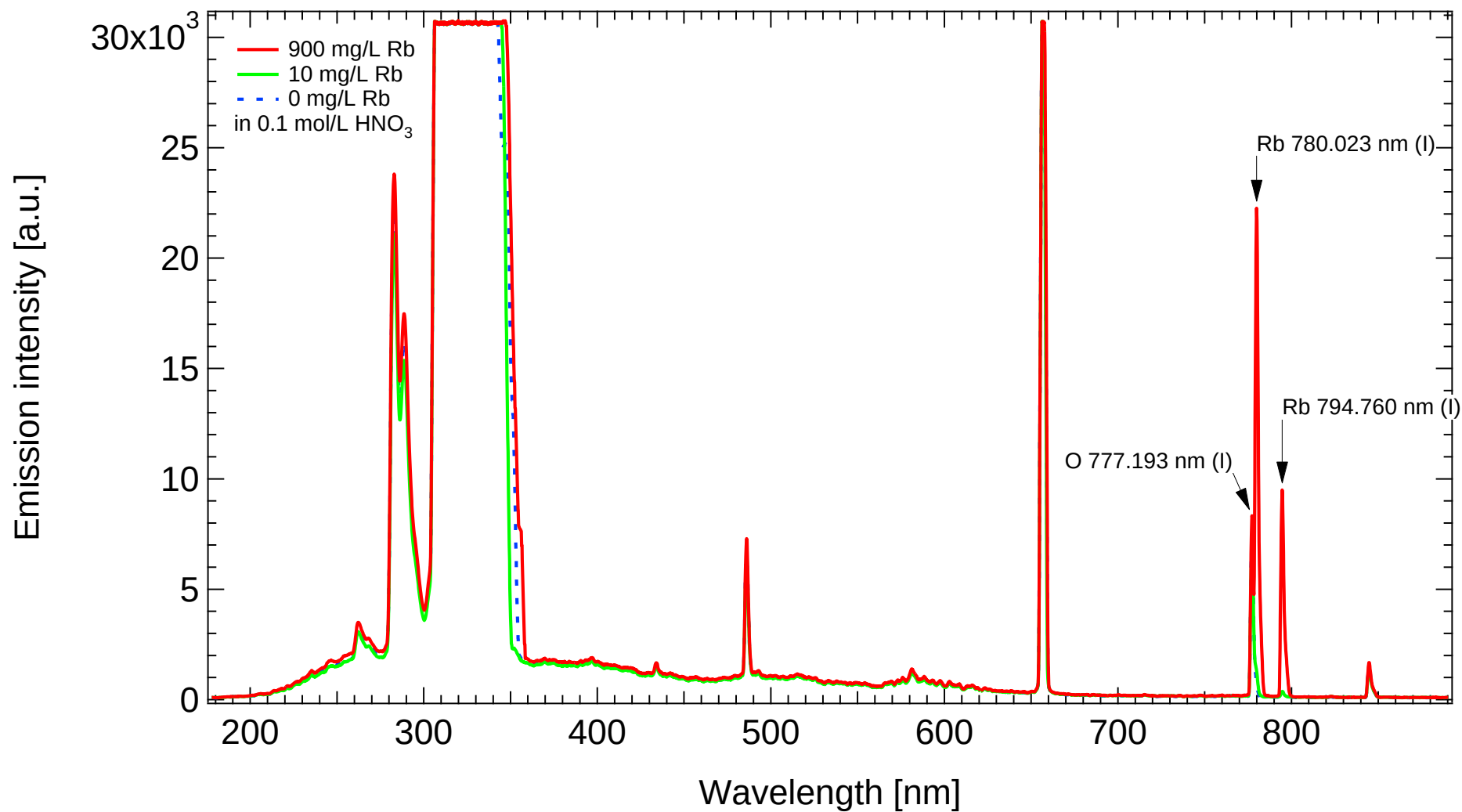


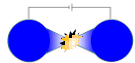
**Rb**

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 30 pulses

LepiCuve-C





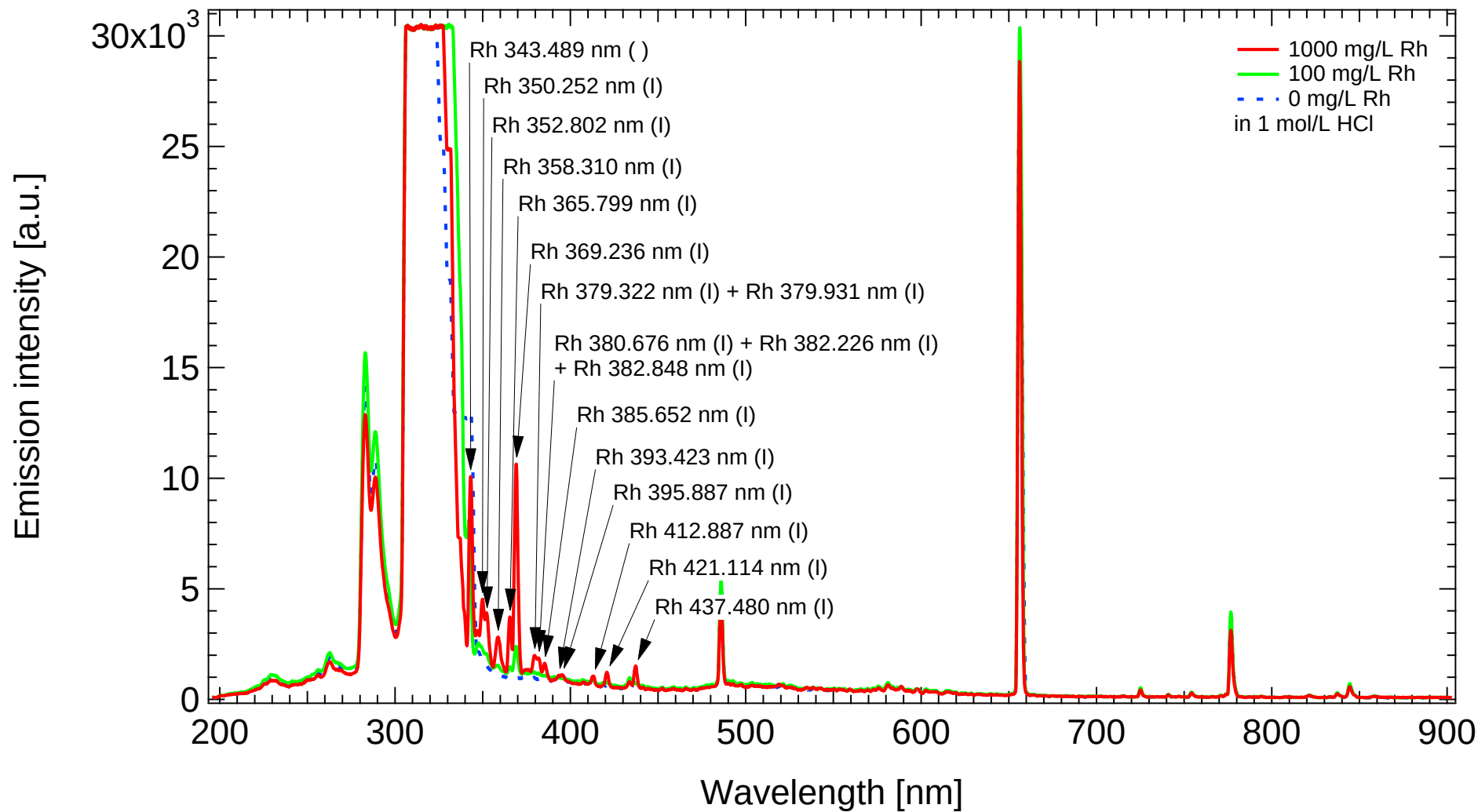
Spectra [T00090J]

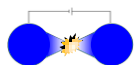
Rh

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses

LepiCuve-C





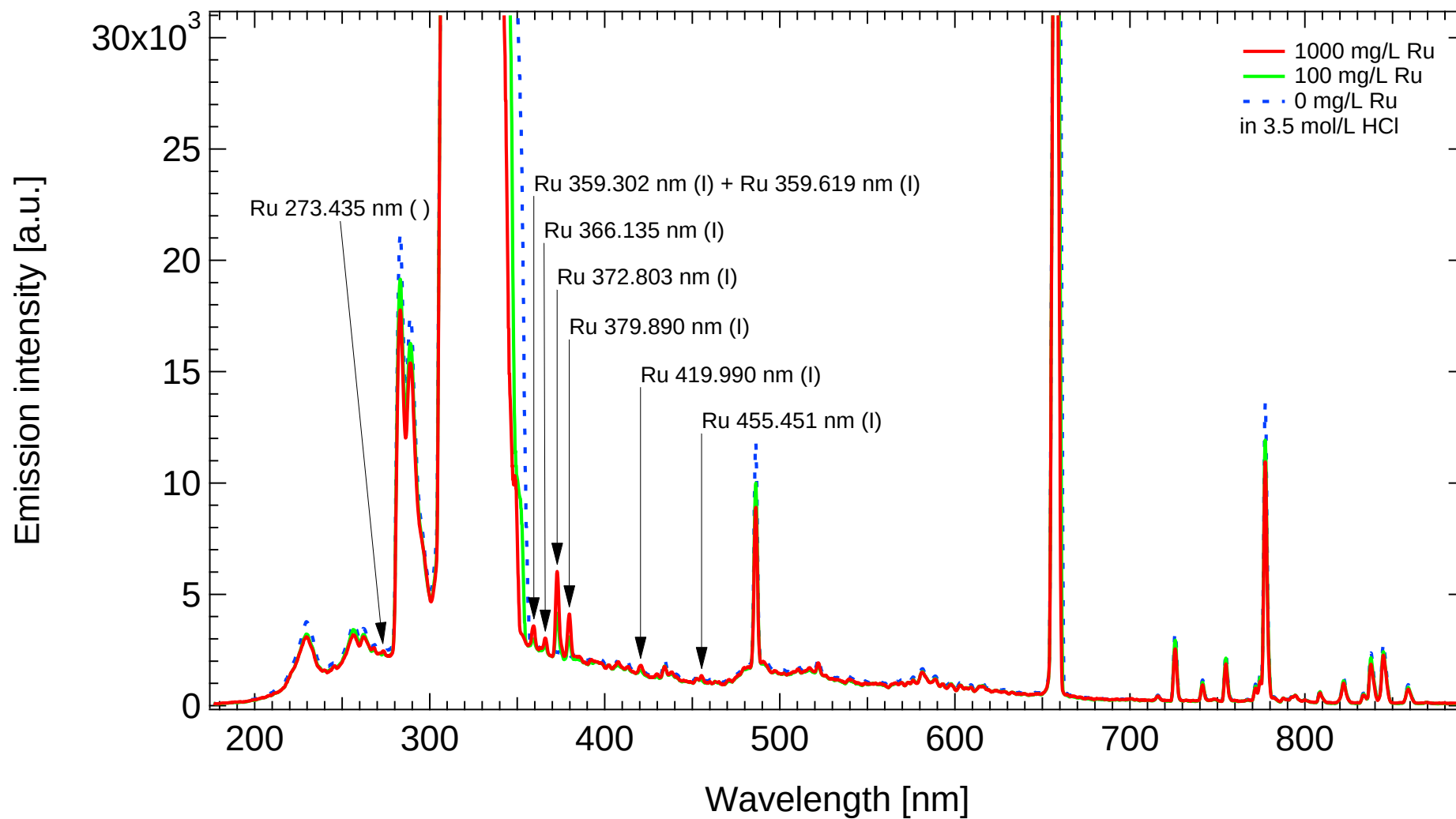
Spectra [T00090J]

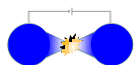
Ru

MH-5000 s2086

LepiCuve-C

Conditions: 650 V, (ON: 2 ms / OFF: 110 ms) × 20 pulses





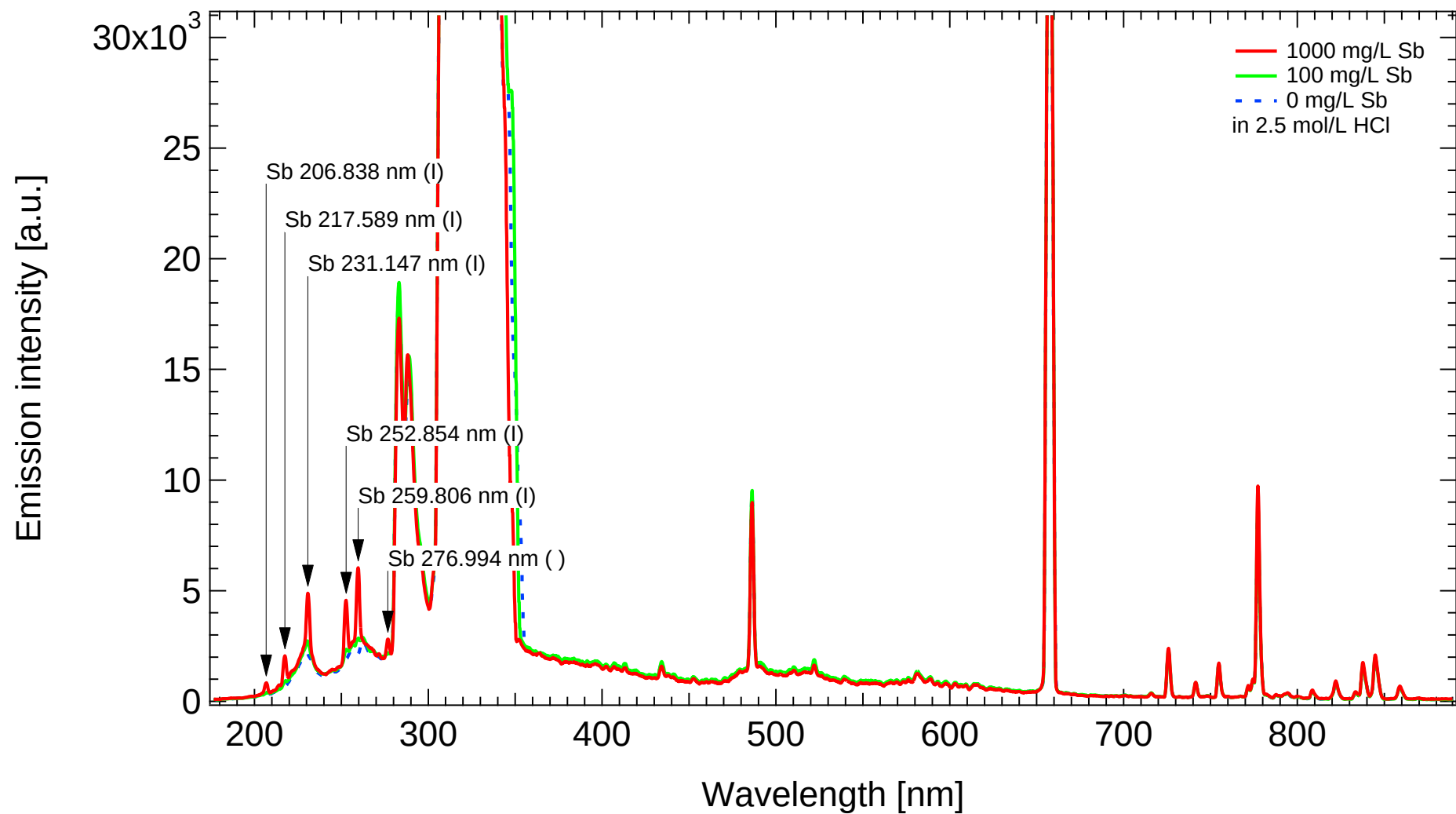
Spectra [T00090J]

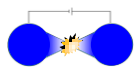
Sb

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 100 ms) × 20 pulses

LepiCuv-C

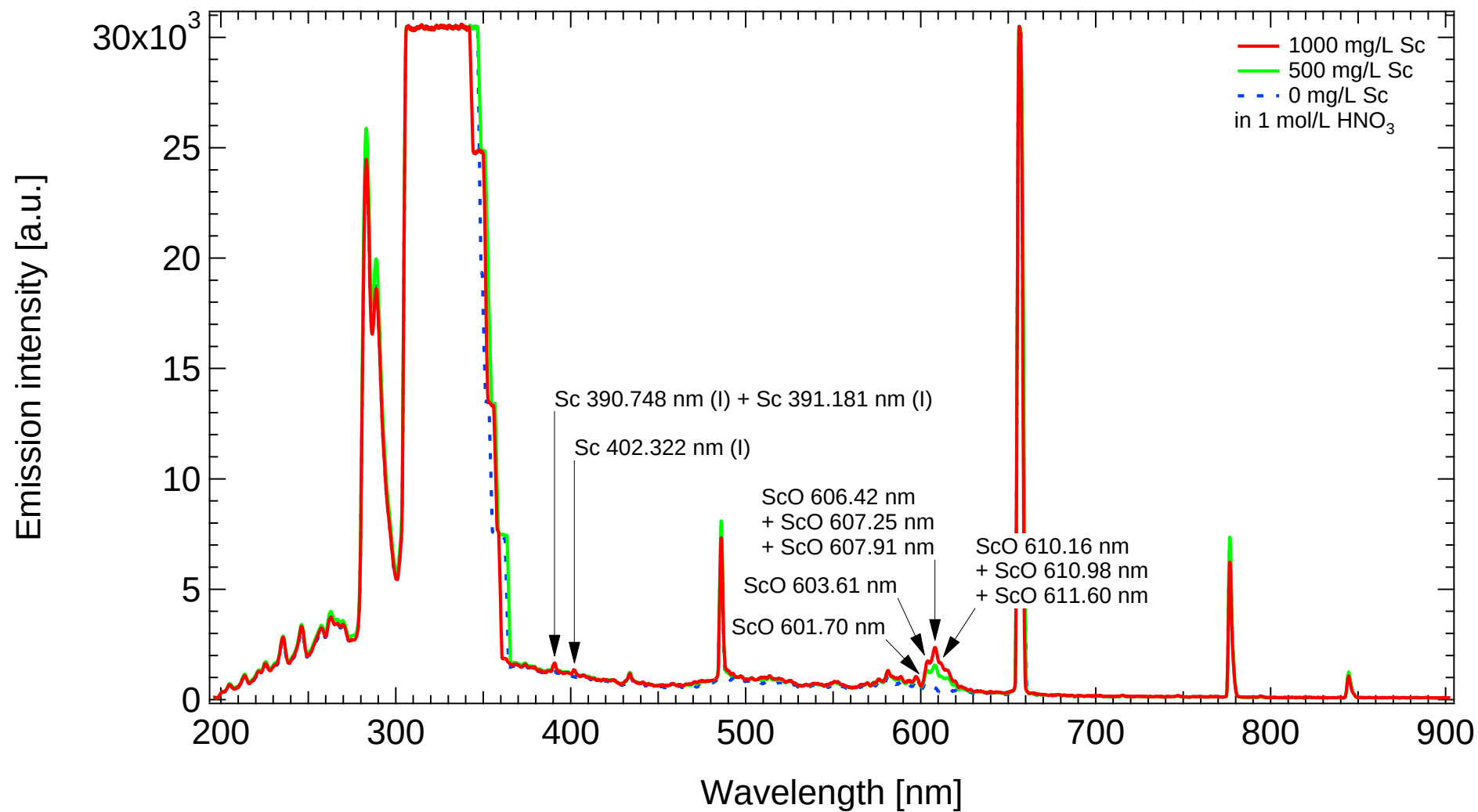


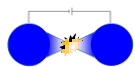
**Sc**

MH-5000 s2086

LepiCuve-C

Conditions: 650 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses





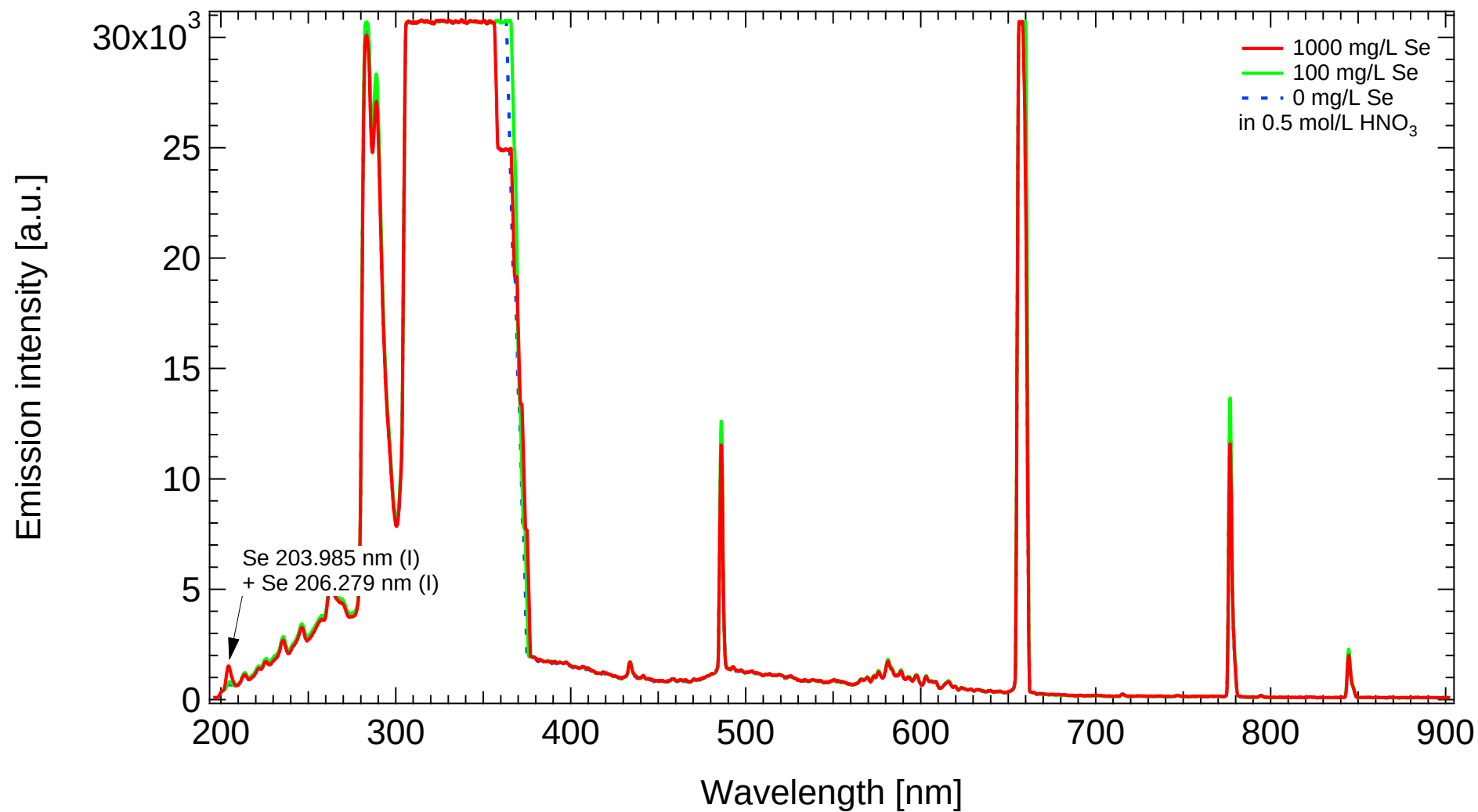
Spectra [T00090J]

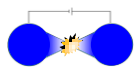
Se

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 50 ms) × 10 pulses

LepiCuv-C





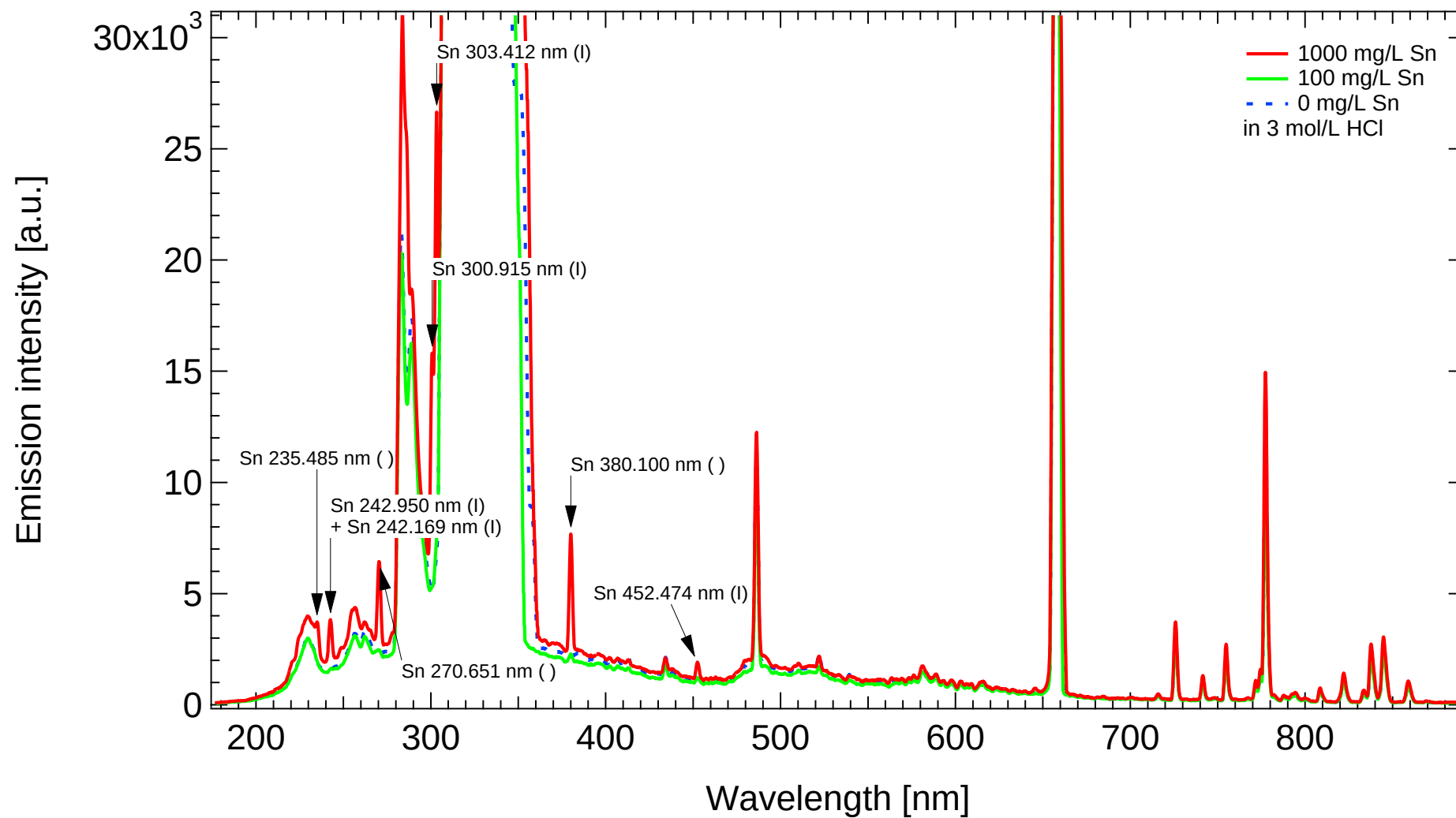
Spectra [T00090J]

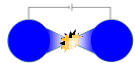
Sn

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 100 ms) × 20 pulses

LepiCuve-C





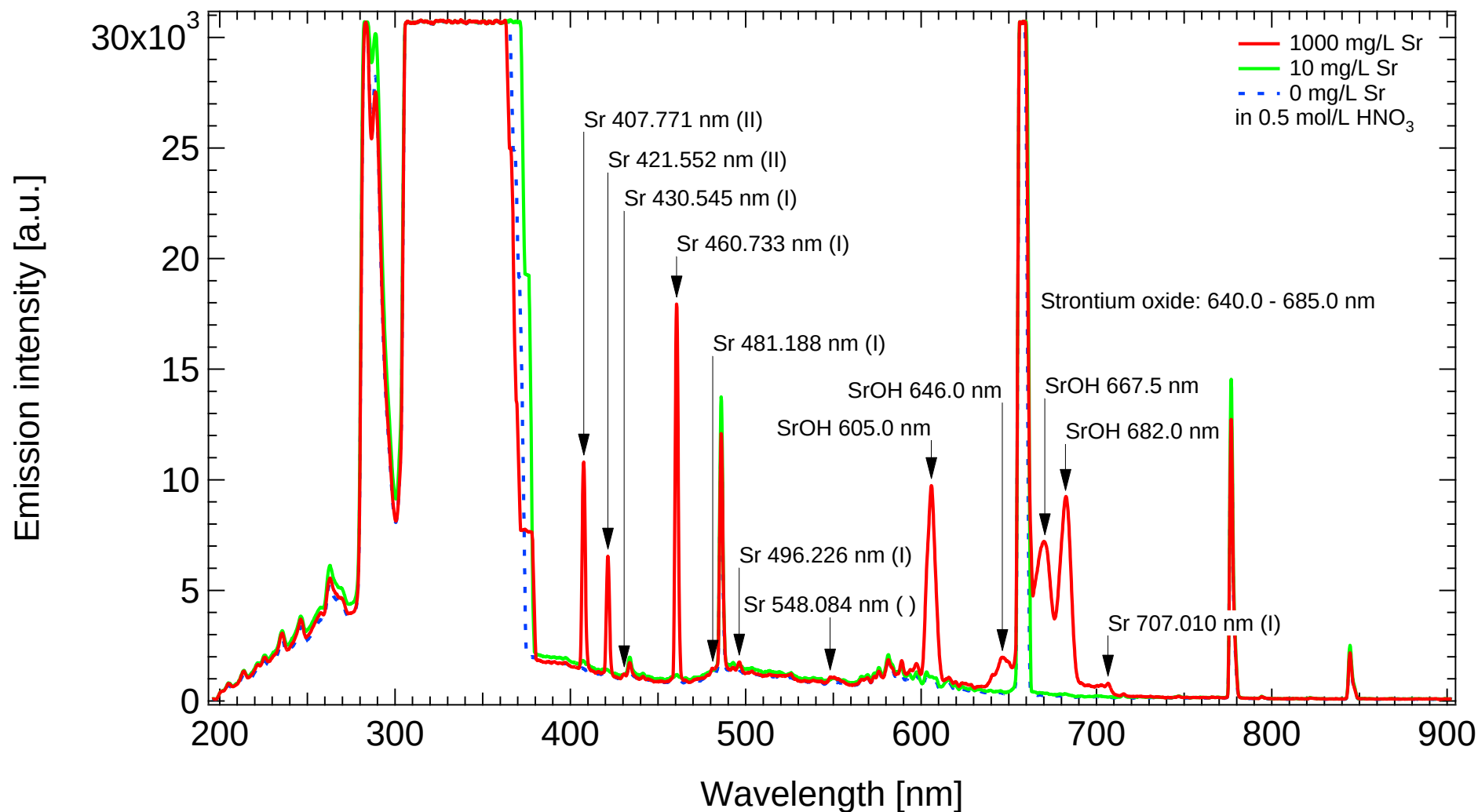
Spectra [T00090J]

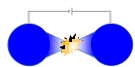
Sr

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 50 ms) × 10 pulses

LepiCuve-C





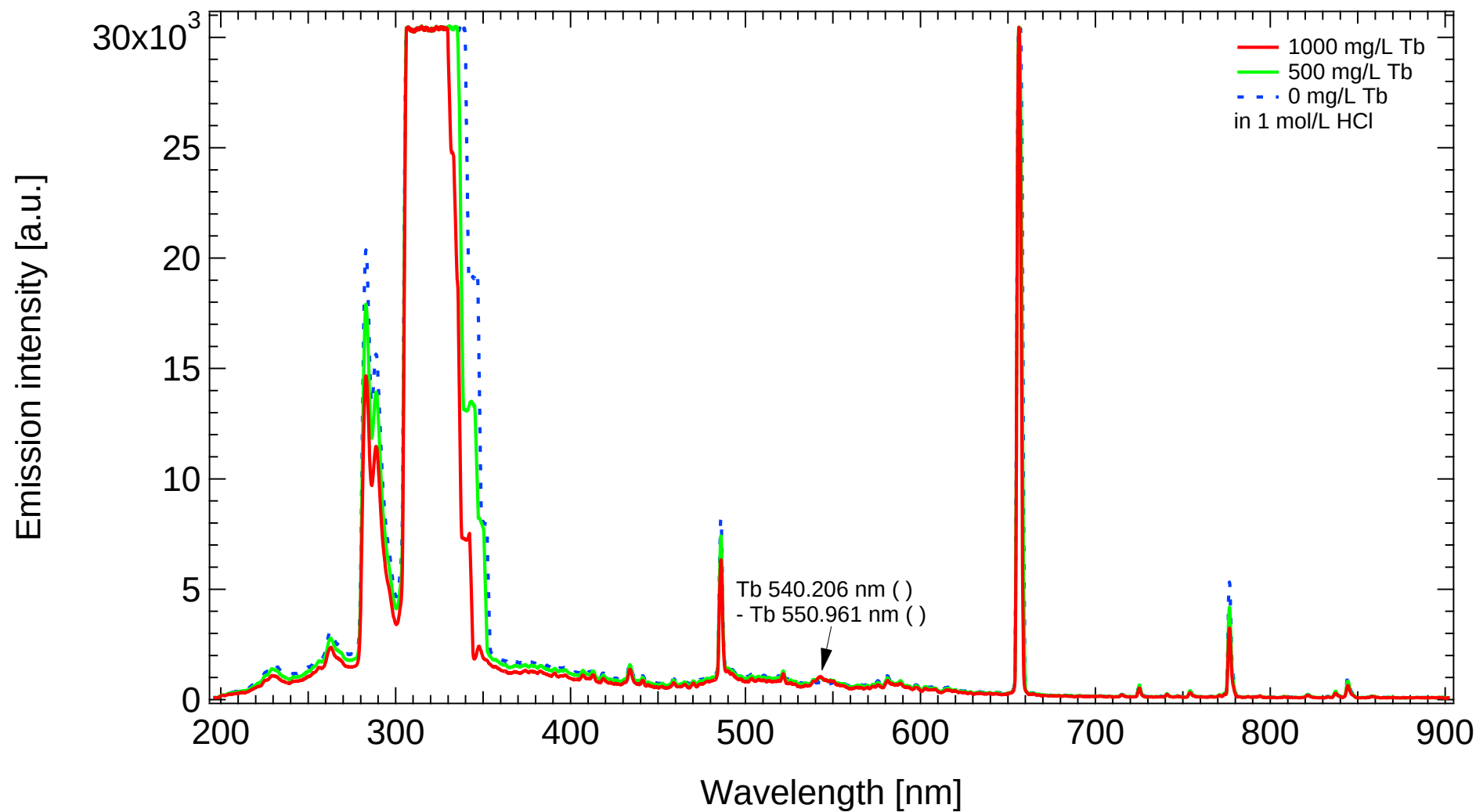
Spectra [T00090J]

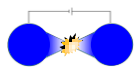
Tb

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses

LepiCuve-C





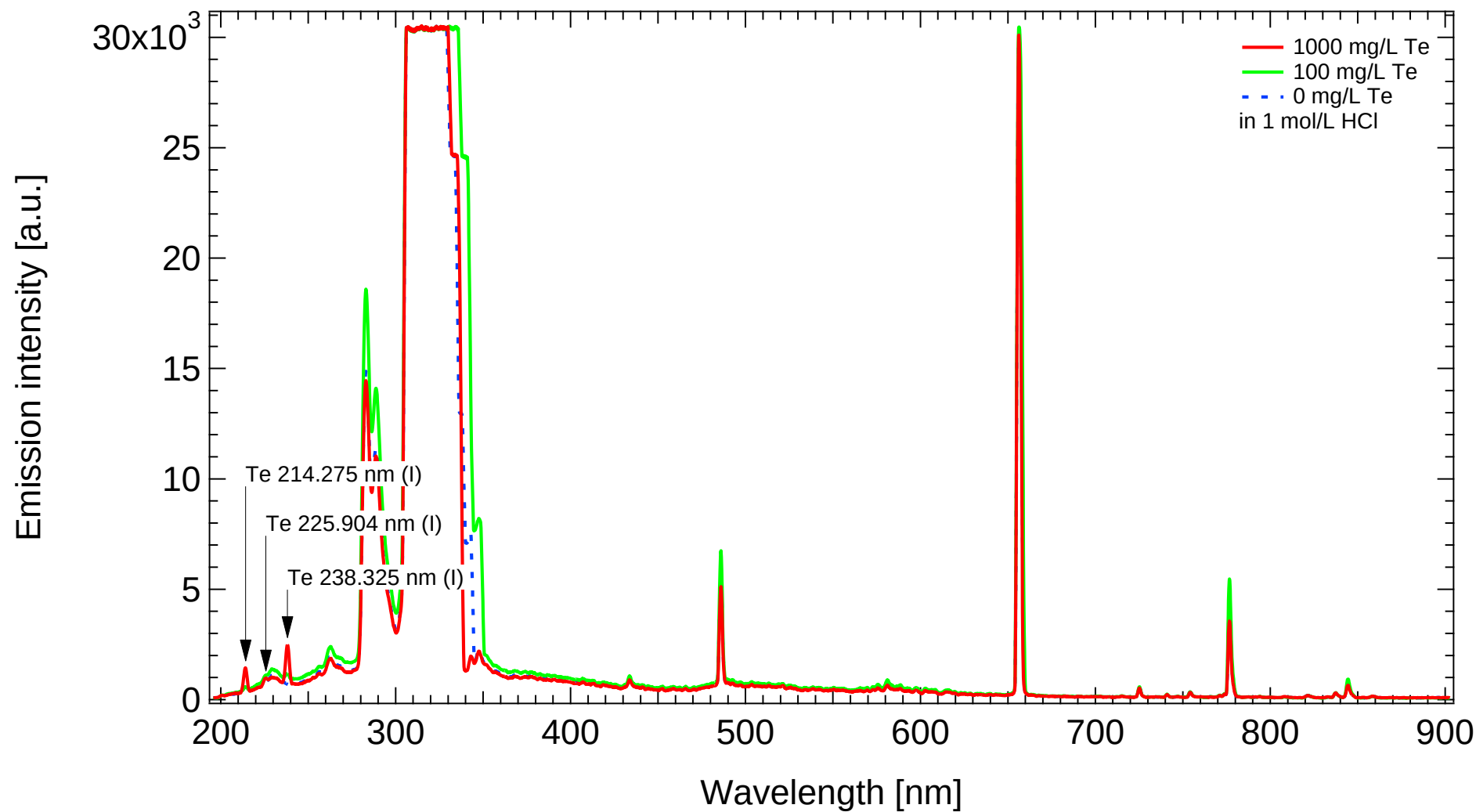
Spectra [T00090J]

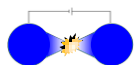
Te

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses

LepiCuvé-C





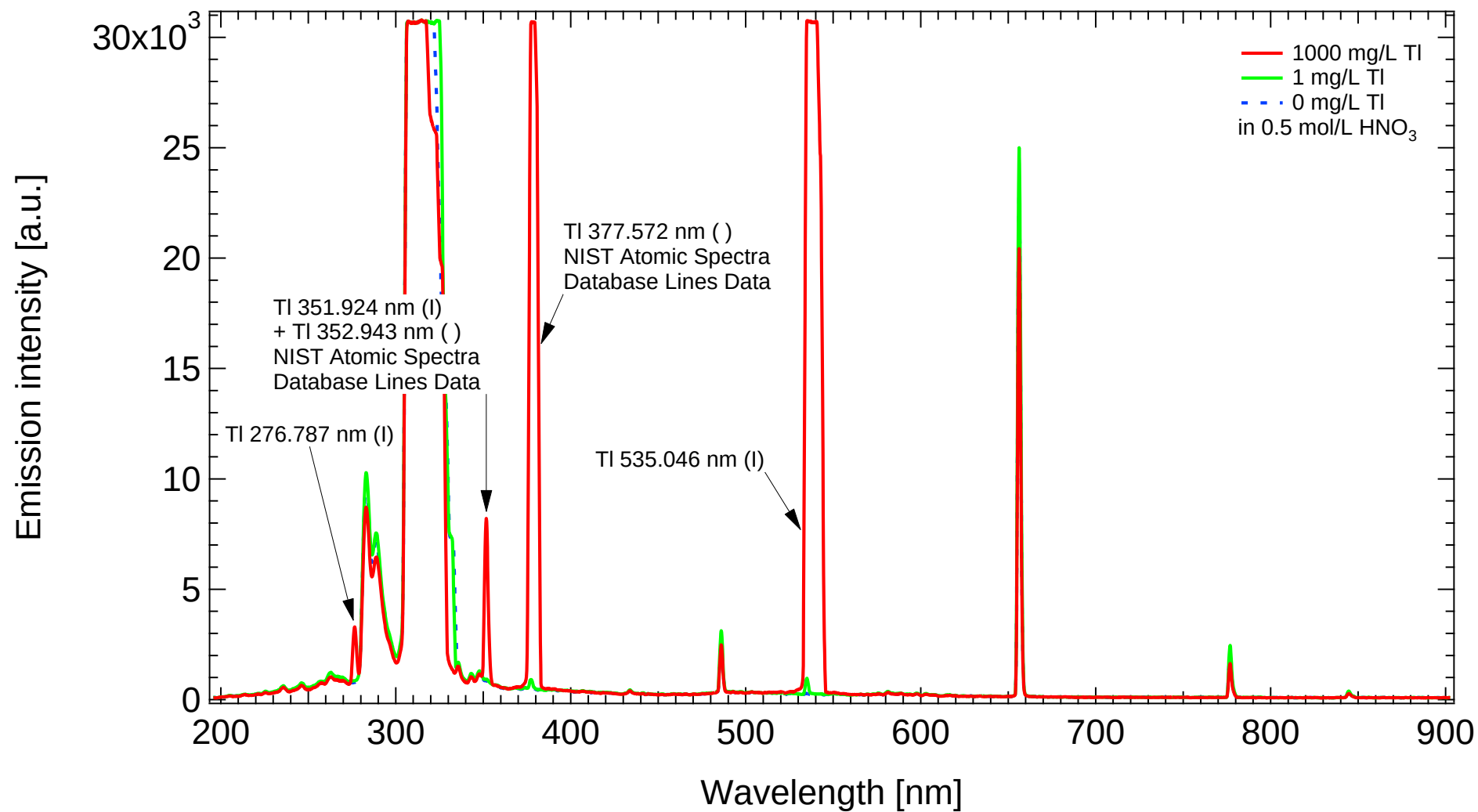
Spectra [T00090J]

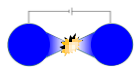
TI

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 50 ms) × 10 pulses

LepiCuv-C





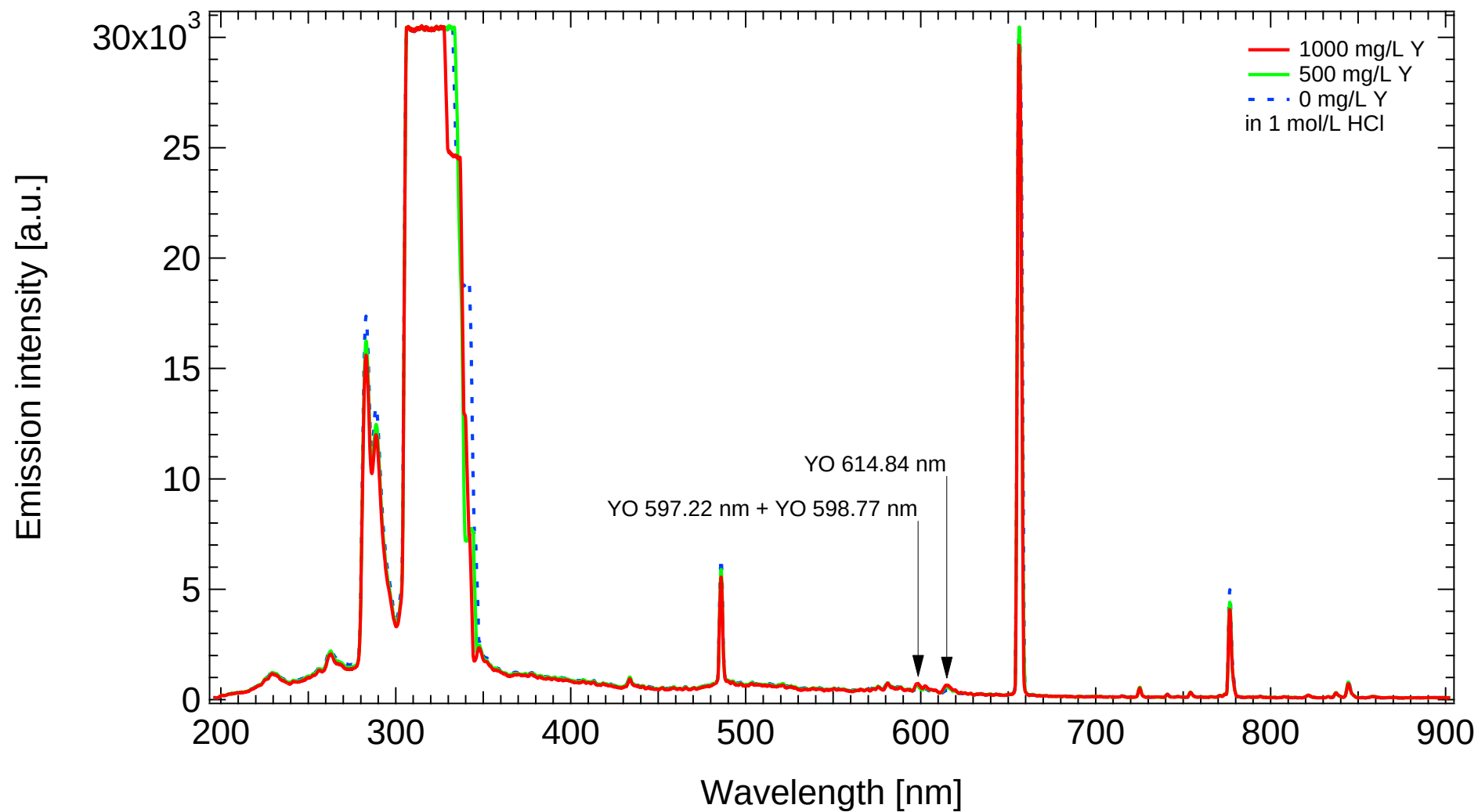
Spectra [T00090J]

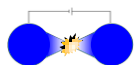
Y

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses

LepiCuve-C





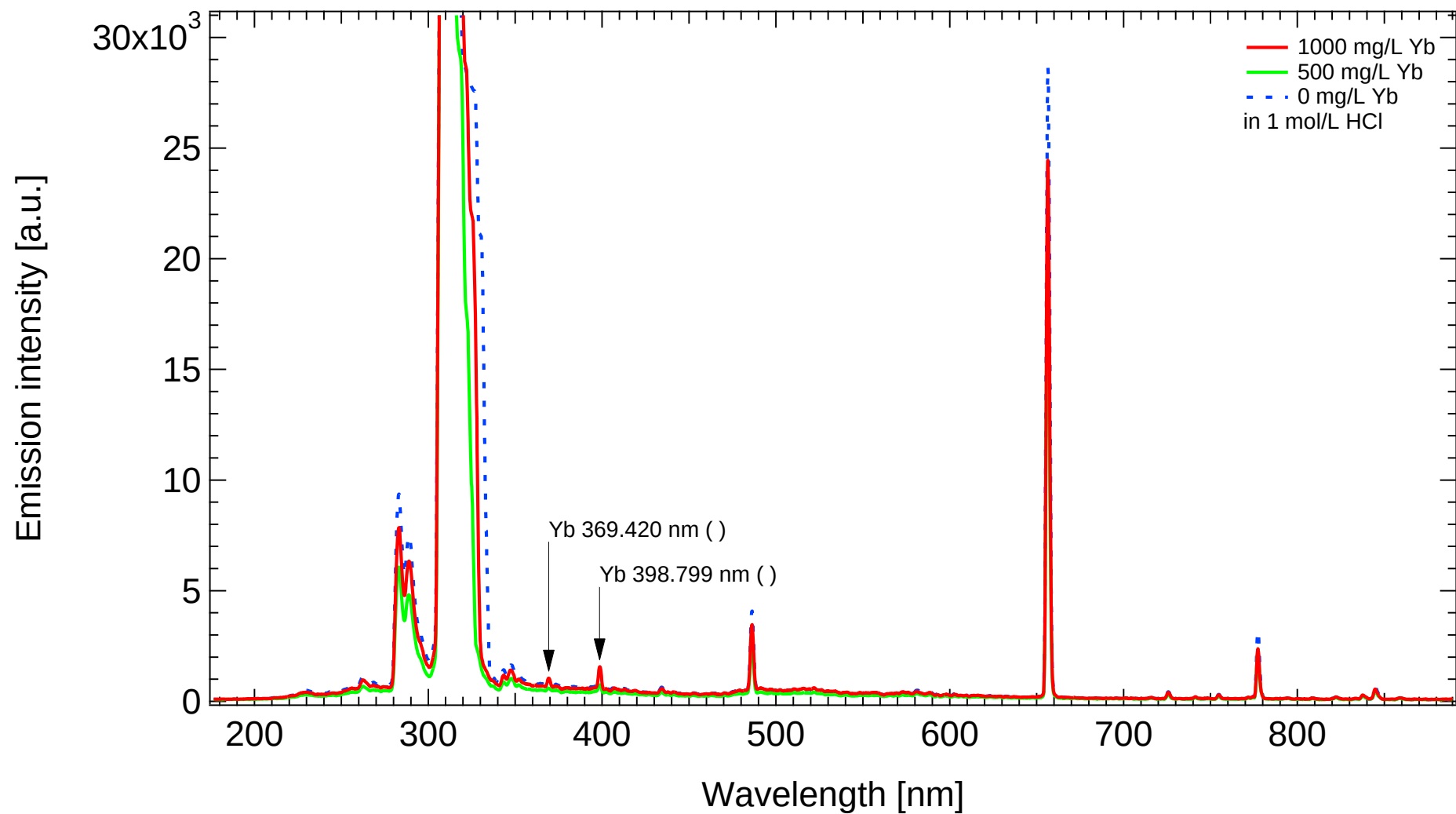
Spectra [T00090J]

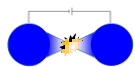
Yb

MH-5000 s2086

Conditions: 650 V, (ON: 2 ms / OFF: 60 ms) × 20 pulses

LepiCuve-C





Spectra [T00090.J]

Zn

MH-5000 s2086

Conditions: 750 V, (ON: 2 ms / OFF: 40 ms) × 20 pulses

LepiCuve-C

