

Verificarea programului cfi cu datele din articol 1

Articol 1: Technical and environmental assessment of gold recovery from secondary streams obtained in the processing of waste printed circuit boards

Autori: Árpád Imre-Lucaci, Melinda Nagy, Florica Imre-Lucaci, Szabolcs Fogarasi

Table 4
The GEs for inputs and outputs calculated in the gold dissolution process.

A. Inputs													
Nr. crt.	Name	Mass Index [kg/kg]	Ecological Impact							Environmental Factor		Environmental Index	
			1	2	3	4	5	6	7	EF_average	EF_mult	EL_average	EL_mult
1	Sludge	184	C	C	A	C	C	B	C	0.3250	5.20	59.8214	957.14
2	H ₂ O ₂	2335	C	C	C	C	B	B	C	0.0750	1.30	175.1374	3035.71
3	HCl	2507	C	C	C	C	A	B	C	0.2500	4.00	626.7170	10027.47
4	water	10,776	C	C	C	C	C	C	C	0.0000	1.00	0	10775.81
TOTAL		15,802								EF:		861.6758	24796.14
										GEI:		0.0545	1.57

B. Outputs																		
Nr. crt.	Name	Mass Index [kg/kg]	Ecological Impact											Environmental Factor		Environmental Index		
			4	5	6	7	8	9	10	11	12	13	14	EF_average	EF_mult	EL_average	EL_mult	
1	Gold	1	C	C	B	B	C	C	C	C	C	C	C	C	0.0750	1.30	0.0750	1.30
2	Ceramic material	183	C	C	C	C	C	C	C	C	C	C	C	C	0.0000	1.00	0.0000	183.07
3	HCl	2506	C	A	B	C	C	A	C	C	C	C	C	0.5000	16.00	125.306	40098.03	
4	Water	12,012	C	C	C	C	C	C	C	C	C	C	C	0	1.00	0	12012.21	
5	O ₂	1100	B	C	C	C	C	C	C	B	C	C	C	0.1500	1.69	164.9258	1858.16	
TOTAL		15,802												EF:		1418.06	54152.78	
														GEI:		0.0897	3.43	

Introducerea datelor din Articol 1 in programul cfi:

1. Introducerea marimilor de intrare si iesire:

Input data

ID	Component	Mass index (kg)
1	SLUDGE	184
2	H2O2	2335
3	HCL	2507
4	WATER	10776

Calculate Total input mass: 15802

Output data

ID	Component	Mass index (kg)	It is taken into account
1	gold	1	YES
2	CERAMIC ...	183	NO
3	HCL	2506	NO
4	WATER	12012	NO
5	O2	1100	NO

2. Calcul MI proces pentru marimile de intrare si fisierle generate:

Calculate mass index for the input data

ID	Mli
1	184
2	2335
3	2507
4	10776

MI proces_j: 15802

input mass index Mli - Notepad

```
File Edit Format View Help
184
2335
2507
10776
```

input mass index MIproces_i - Notepad

```
File Edit Format View Help
15802
```

3. Calcul MI proces pentru marimile de iesire si fisierele generate:

Calculate mass index for the output data

Mass index for output data

ID	Mlo
2	183
3	2506
4	12012
5	1100

MI proces_o: 15803

input mass index Mlo - Notepad

```
File Edit Format View Help
1
183
2506
12012
1100
```

input mass index MIproceso - Notepad

```
File Edit Format View Help
15803
```

OBS: Fiserele reprezinta date intermediare care sunt utilizate in calculele ulterioare

4. Asocierea categoriilor de impact pentru marimile de intrare :

Impact categories (Input)

- Raw material availability
- Complexity of the synthesis
- Critical material use
- Thermal risks
- Acute toxicity
- Chronic toxicity
- Endocrine disruption potential
- Global warming potential
- Ozone depletion potential
- Acidification potential
- Photochemical ozone creation potential
- Odour
- Eutrophication potential
- Organic carbon pollution potential

Input

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	C	C	A	C	C	B	C	A	A	A	A	A	A	A
	C	C	C	C	B	B	C	A	A	A	A	A	A	A
	C	C	C	C	A	B	C	A	A	A	A	A	A	A
	C	C	C	C	C	C	C	A	A	A	A	A	A	A

Output

	Resources	Grey input	Component risk	Organisms	Air	Water/soil
	C	A	C	B	A	A
	C	C	C	B	A	A
	C	C	C	A	A	A
	C	C	C	C	A	A

Calculate impact groups for the input data

5. Asocierea categoriilor de impact pentru marimile de iesire:

Impact categories (Output)

- Raw material availability
- Complexity of the synthesis
- Critical material use
- Thermal risks
- Acute toxicity
- Chronic toxicity
- Endocrine disruption potential
- Global warming potential
- Ozone depletion potential
- Acidification potential
- Photochemical ozone creation potential
- Odour
- Eutrophication potential
- Organic carbon pollution potential

Input

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	A	A	A	C	C	B	B	C	C	C	C	C	C	C
	A	A	A	C	C	C	C	C	C	C	C	C	C	C
	A	A	A	C	A	B	C	C	C	A	C	C	C	C
	A	A	A	C	C	C	C	C	C	C	C	C	C	C
	A	A	A	B	C	C	C	C	C	B	C	C	C	C

Output

	Resources	Grey input	Component risk	Organisms	Air	Water/soil
	A	A	C	B	C	C
	A	A	C	C	C	C
	A	A	C	A	A	C
	A	A	C	C	C	C
	A	A	B	C	B	C

Calculate and export environmental factors and general effect indexes

6. Calcul rezultate in fișiere:

In lucrare: pentru marimile de intrare:

Environmental Factor		Environmental Index	
EF_average	EF_mult	EI_average	EI_mult
0.3250	5.20	59.8214	957.14
0.0750	1.30	175.1374	3035.71
0.2500	4.00	626.7170	10027.47
0.0000	1.00	0	10775.81
EI:		861.6758	24796.14
GEI:		0.0545	1.57

Environmental Factor		Environmental Index	
EF_average	EF_mult	EI_average	EI_mult
0.0750	1.30	0.0750	1.30
0.0000	1.00	0.0000	183.07
0.5000	16.00	1253.06	40098.03
0	1.00	0	12012.21
0.1500	1.69	164.9258	1858.16
EI:		1418.06	54152.78
GEI:		0.0897	3.43

Rezultatele obtinute prin programul nostru:

Se observa ca datele din lucrare sunt identice cu rezultatele obtinute prin programul nostru.

```
*TEXT2 - Notepad
File Edit Format View Help

Input
Comp      EFmw_i  EFmult_i  EImw_i    EImult_i
Input0.00  0.33    5.20      59.80     956.80
Input1.00  0.08    1.30      175.13    3035.50
Input2.00  0.25    4.00      626.75    10028.00
Input3.00  0.00    1.00      0.00      10776.00

Output
Comp      EFmw_o  EFmult_o  EImw_o    EImult_o
Output0.00  0.08    1.30      0.08      1.30
Output1.00  0.00    1.00      0.00      183.00
Output2.00  0.50    16.00     1253.00   40096.00
Output3.00  0.00    1.00      0.00      12012.00
Output4.00  0.15    1.69      165.00    1859.00

-----

EImw_process_i=861.68
EImult_process_i=24796.30
EImw_process_o=1418.08
EImult_process_o=54151.30

-----

GEImw_i=0.05
GEImult_i=1.57
GEImw_o=0.09
GEImult_o=3.43

-----
|
```

Se observa ca datele din lucrare sunt identice cu rezultatele obtinute prin programul cfi.