Electronic Supplementary Material (ESI) for Environmental Science: Processes & Impacts.

Electronic Supplementary Information

MEASUREMENTS OF ORGANIC AND ELEMENTAL CARBON IN DOWNTOWN ROME AND BACKGROUND AREA: PHYSICAL BEHAVIOR AND CHEMICAL SPECIATION

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Table 1. Nuclear data and Limit of Detection (LOD) of the elements determined by INAA. (m: minutes; h: hours; d: days; y: years).

Element	Product nuclide	Cross Section[41] (barn)	Half life		γ-Ray used (keV)	LOD[a] (ng m^{-3})
Ag	^{110m}Ag	4.5	249.9	d	657.7	0.06
As	^{76}As	4.3	1.096	d	559.2	1
Au	^{198}Au	98.8	2.697	d	411.8	0.001[a]
Ba	^{131}Ba	13.5	11.8	d	496.3	5
Br	^{82}Br	2.69	1.47	d	776.5	0.5
Ca	^{47}Sc	0.70	3.42	d	159.8	300
Cd	^{115m}In	300	53.38	h	527.8	0.3
Ce	^{141}Ce	0.57	32.38	d	145.4	0.05
Co	^{60}Co	37.2	5.272	y	1332.5	0.01
Cr	^{51}Cr	15.9	27.7	d	320.0	0.2
Cs	^{134}Cs	29.0	2.062	y	795.7	0.02
Eu	^{152}Eu	5900	12.7	y	1408.0	0.01
Fe	^{59}Fe	1.15	45.1	d	1099.2	50
Hf	^{181}Hf	12.6	42.5	d	482.2	0.01
Hg	^{203}Hg	3.8	46.59	d	279.0	0.02
K	^{42}K	1.46	12.36	h	1524.7	50
La	^{140}La	9.0	40.27	h	1596.2	0.1
Mg	^{27}Mg	0.0382	9.46	m	1014.1	50
Mn	^{56}Mn	13.3	2.576	h	1810.7	0.5
Mo	^{99}Mo	0.45	2.76	d	141.0	0.2
Na	^{24}Na	0.53	15.0	h	1368.4	100
Nd	^{147}Nd	1.3	11.06	d	531.0	1[a]
Ni	^{58}Co	0.113	70.78	d	810.7	1
Rb	^{86}Rb	72.1	18.66	d	1076.7	1
Sb	^{122}Sb	6.25	2.70	d	564.0	0.2
Sc	^{46}Sc	26.5	83.85	d	889.2	0.003
Se	^{75}Se	51.8	120.4	d	264.6	0.1
Sm	^{153}Sm	206	1.948	d	103.1	0.41[b]
Th	^{233}Pa	7.40	27.4	d	311.8	0.1
V	^{52}V	4.88	3.75	m	1434.4	1
W	^{187}W	37.8	23.9	h	685.7	0.01[a]
Yb	^{175}Yb	65	4.19	d	396.1	0.01[a]
Zn	^{65}Zn	0.78	243.8	d	1115.5	0.5

[a]Calculating according to [42].

[b]The values are expressed as ppb (ng g^{-1})

Table 2. Results (mean ± standard deviation) of INAA quality control on IAEA air filter and USGS GRX-1 Standard Reference Materials (μg g^{-1}). The "measured value" is the average of seven determinations on seven different replicates (n.d. = not determined; - = absent in the Standard Reference Material).

	IAEA air filter		USGS GRX-1	
	measured	certified	measured	certified
As	4.9±0.5	5.6	456±9	460±30
Au	1.26±0.10	1.15	n.d.	-
Ba	43.4±0.5	53.8	n.d.	-
Cd	10.6±1.0	9.96	n.d.	-
Co	1.3±0.1	1.12	6.3±0.2	9.3±1.1
Cr	4.7±0.8	5.6	11±1	10±2
Cs	n.d.	-	1.6±0.4	4.0±1.1
Cu	51.6±0.5	48.8	n.d.	-
Eu	n.d.	-	0.60±0.05	0.68±0.07
Fe	193±17	207.9	25000±2000	24700±1800
Hg	0.96±0.07	1.00	n.d.	-
La	n.d.	-	5.7±0.6	6.1±0.3
Mn	31.2±1.0	31.9	n.d.	-
Mo	1.26±0.2	1.14	n.d.	-
Na	n.d.	-	498±21	550±110
Ni	7.6±0.5	8.0	44±6	42±10
Sb	n.d.	-	152±6	124±6
Se	1.01±0.10	1.06	20.2±0.5	18.6±0.8
Sm	n.d.	-	9.7±3.9	10±2
U	0.78±0.10	1.02	n.d.	-
V	8.04±0.35	8.00	n.d.	-
Yb	n.d.	-	2.1±0.3	1.8±0.5
Zn	132±18	152	681±49	740±110

Figure 1. Master scheme for INAA investigation of samples and standards.

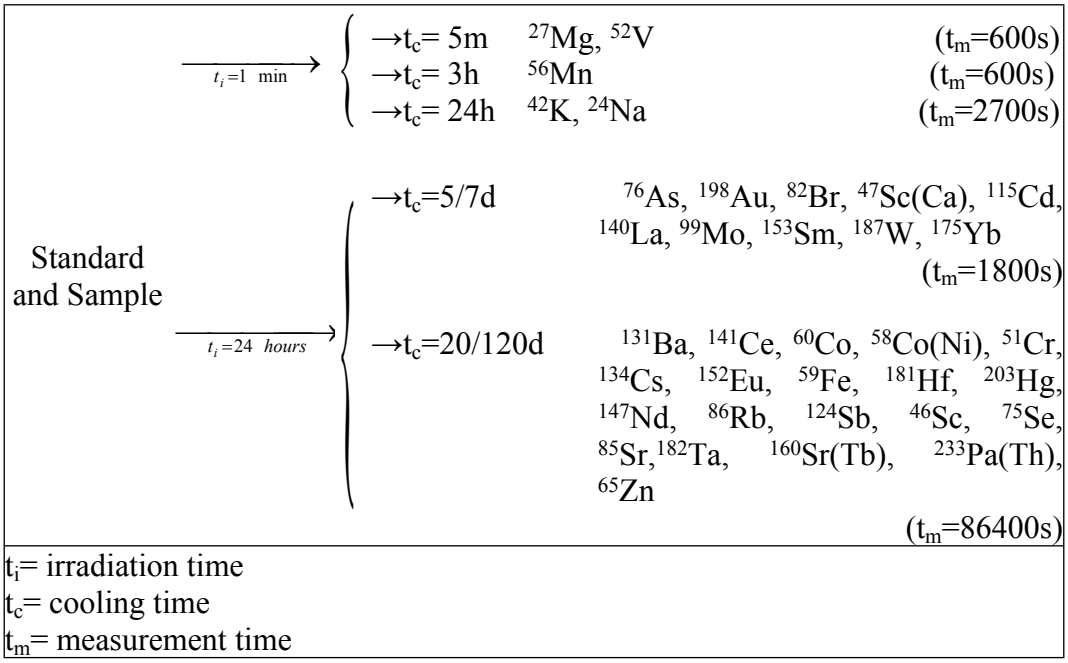

Figure 2. Master scheme of the analytical procedure for the separation of *n*-alkanes, *n*-alkanoic acids and PAHs in the fine organic particulate matter.

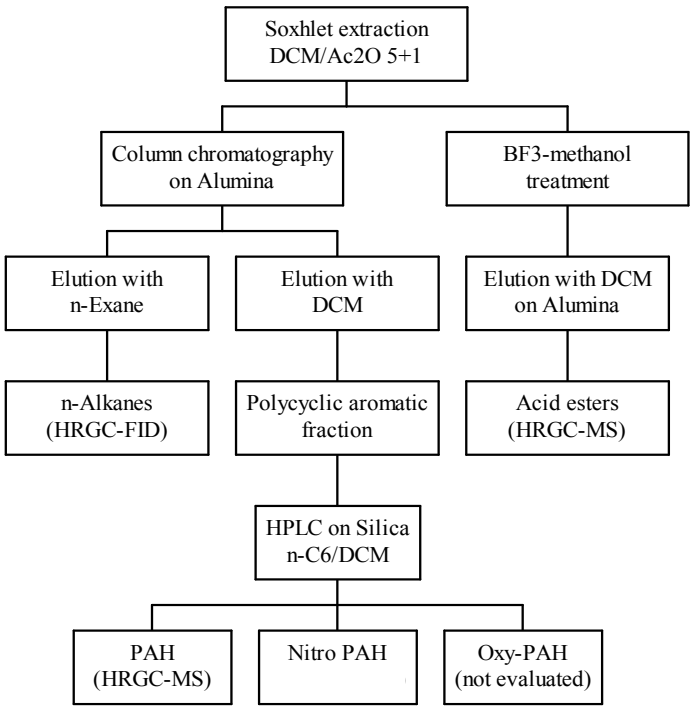

Figure 3. Daily evolution of primary gas pollutants (CO and benzene) and carbon particles along with the Radon modulation.