Data Ion Chromatography Analysis

Object / Record : **V 149 b1 (KN&V)**

Artist : Andries Copier - BV Kon. Glasfabriek Leerdam

Title and date : Whiskyglas - 1928 - vormgeblazen

Conservator : Mandy Slager

General condition

Date: 16/09/2020

2013:Slecht, dof uiterlijk, zepige binnenzijde, weeping
2013: cleaned (demineralized water::ethanol (4:!), VAB images taken, very cloudy with fingerprints before and clean afterwards
2020: 17 sept: samples taken and IC analysis: matig, wolkachtige vettige aanslag, vingerafdrukken en krasjes. Condition red = very poor
2023: b.1 scratches, b.5 dust interior cuppa, c.2 slippery interior cuppa, d.1 droplets interior cuppa

Very poor

Examination and analysis

Date: 01/08/2023

Analysis september 2020: samples were taken from the exterior surface of the object for analysis by means of Ion Chromatography by G. Verhaar and M. Slager/UvA students. The results show relatively medium high concentrations of Sodium.

Potentially unstable

Concentrations (mg/L)

Anions

	U	Ave	SD	RSD
Fluoride	19,00	0,003	0,004	1,414
Acetate	60,05	0,000	0,000	0,000
Formate	45,02	0,000	0,000	0,000
Chloride	35,45	0,075	0,007	0,088
Nitrite	46,01	0,000	0,000	0,000
Bromide	111,96	0,000	0,000	0,000
Nitrate	62,01	0,000	0,000	0,000
Carbonate	60,01	0,948	0,051	0,053
Sulfate	96,06	0,199	0,016	0,061
Phosphate	94,97	0,000	0,000	0,000

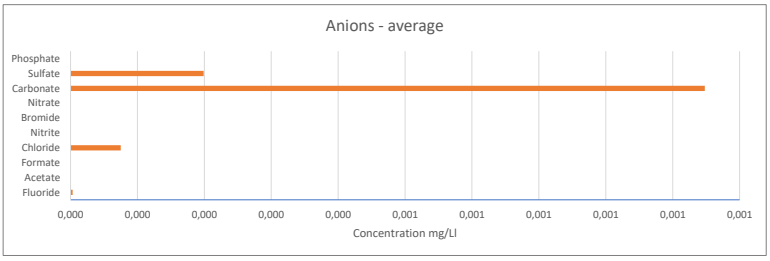
Cations

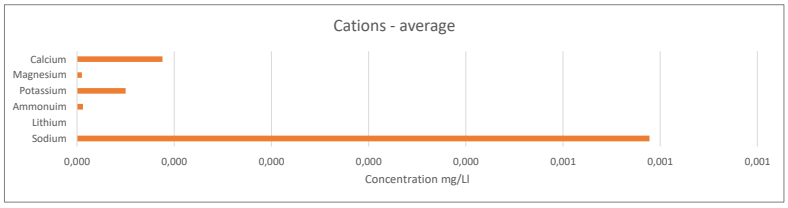
	U	Ave	SD	RSD
Sodium	22,99	0,589	0,090	0,153
Lithium	6,94	0,000	0,000	0,000
Ammonuim	18.04	0,006	0,001	0,096
Potassium	39,10	0,050	0,002	0,044
Magnesium	24,31	0,005	0,000	0,048
Calcium	40,08	0,088	0,027	0,305

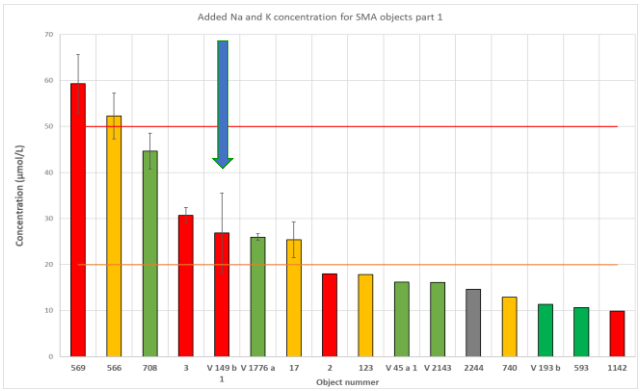
Added Na and K concentrations			
Sodium	22,99	25,620	
Potassium	39,10	1,279	
Total	µmol/L	26,899	Potentially unstable

Categorisation total alkaly ion concentration		µmol/L
IC-A	Likely stable	< 20
IC-B	potentially unstable	>20 <50
IC-C	likely unstable	> 50

Graphs and/or Tables







Intepretation, questions and comments on results

the object was diagnosed as being in bad condition during the 2013 glass project. It was slippery and weeping inside and appeared cloudy. When looking at the images taken before and after cleaning, taken by the Visual Art Box, it can be seen that the cloudiness was gone after cleaning. The object appeared to be ok again. But when looking at the object again in 2020 and now in 2023 we notice that the situation has not changed in the sense that the object is slippery again (again on the inside and also the bottom) and the object shows droplets on the interior surface of the cuppa. The cloudiness as can be seen in 2013 has not (yet?) returned.

The results from the IC analysis show relatively high concentrations of Sodium. Also a peaks for carbonate. Although carbonates are often found on unstable glass as well, the method of IC analysis is not very sensitive for carbonates (therefore high default margin).

In the two top graphs with representation of avarage concentrations of anions and cations, the standard deviation can be drawn from the raw data in the left tables, but is not inserted in the graphs. They are inlcuded in the last graph. In the bottom graph the LOQ line and red line indicate that this object falls within the IC-B category. The red colour of the bar indicaties that the condition was assessed as being very poor during visual examination prior to sample taking. It shows that the signs visually noticed were not entirely in line with the IC results. The situation was assessed as being very poor, but the result of the analysis is potentially unstable. It is likely that since the sample taking was done on the exterior surface of the object, the concentrations detected were lower. Perhaps when samples would have been taken from the interior surface it would result in likely unstable.

Suggestions further examination or analysis

* More information about the manufacturing process and the technical/material information from Leerdam factory can be gathered.
* Compositional analysis (XRF or other) to be able to combine data from visual examination with IC data and composition informatipon for even deeper understanding of condition.
* Development of a cleaning strategy