

# Determination of Chromium (VI) in Toys by IC-ICPMS



## Application Industry

Plastic parts, Metal parts, Electronic components

## Key Words

Toys, Chromium (VI), Morphological analysis

## Introduction

CIC-D120 ion chromatograph and inductively coupled plasma mass spectrometry (ICP-MS) were used to analyze migration chromium (VI) in toys with high-speed and high-sensitivity, which met the requirements of European Union toy safety standards EN 71-3 2013+A3 2018 and RoHS for the detection of chromium (VI) (according to IEC 62321).

According to (EU) 2018/725, item 13 of Part III of European Union Toy Safety Directive 2009/48/EC Annex II, the migration limit of chromium (VI) is adjusted as follows:

**Migration limits of chromium (VI) from toy materials  
( mg/kg)**

Category I Dry, brittle, powder like or pliable	
( EU ) 2018/725 ( after 18/11/2019 )	0.02 mg/kg
Limit requirement ( before 17/11/2019 )	0.02 mg/kg
Category II Liquid or sticky materials	
( EU ) 2018/725 ( after 18/11/2019 )	0.005 mg/kg
Limit requirement ( before 17/11/2019 )	0.005 mg/kg
Category III Scraped-off materials	
( EU ) 2018/725 ( after 18/11/2019 )	0.053 mg/kg
Limit requirement ( before 17/11/2019 )	0.2 mg/kg

## Equipment and Instruments



CIC-D120 Ion Chromatograph, includes :

-High pressure pump



- Six-way valve
- Anion self regenerate suppressor
- SH-AC-11/AG7 column

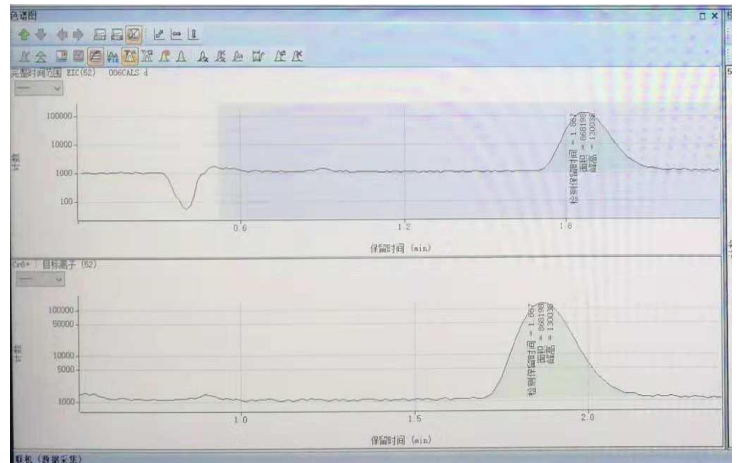
**Analysis Condition**

Eluent : 0.6 mmol EDTA-2Na and 0.07 mmol NH<sub>4</sub>NO<sub>3</sub> are constant-volumed to 1000mL by ultra-pure water, and then adjust the pH value to 7.1 by ammonia

Leaching method : isocratic elution

Flow rate : 0.7mL/min

Injection volume :200μL( It can be adjusted according to the actual analysis. )



0 ppb, 1 ppb, 2 ppb, 5 ppb and 10 ppb chromium (VI) standard solutions were prepared for linear test. It can be seen from the following figure that the linear correlation coefficient is 0.9999, and the linear result is good.

**Analysis Condition of ICP-MS**

The software of ICP-MS should have the acquisition mode or similar functional components.

The parameters are set according to the products of different manufacturers.

**Results and Discussions**

After online completion, the above ion chromatographic conditions and ICP-MS instrument parameters were set up for sample analysis of chromium (VI). It can be seen from the figure that the chromium (VI) has a good peak in ICP-MS and can be detected within 3 minutes.

