

**14C**  
S C A R



THE UNIQUE TOOL  
FOR RADIOCARBON  
DETECTION

ppq  
SENSE

## THE INSTRUMENT

**<sup>14</sup>C** SCAR is a high-precision, laser-based, table-top <sup>14</sup>CO<sub>2</sub> analyzer, based on a new spectroscopic technique called saturated-absorption cavity ring-down (SCAR). Radiocarbon (<sup>14</sup>C) is a radioactive chemical element, with a natural abundance of about 1 atom every 1 trillion carbon atoms. At present, accelerator mass spectrometry (AMS) is the reference technology for high-precision radiocarbon measurements.

Thanks to its new technology, **<sup>14</sup>C** SCAR allows to take radiocarbon measurements in your laboratory in a simple and reliable way.

## APPLICATIONS

### **Environmental monitoring and CO<sub>2</sub> emission quotes**

The CO<sub>2</sub> emission quotes have become products to measure, valorize and exchange on global financial markets. Therefore, the accurate high resolution <sup>14</sup>CO<sub>2</sub> measurement is essential.

### **Certification of biogenic fraction in materials**

The distinction between emissions of fossil and non-fossil origins is crucial for quality evaluation of products: knowing the biogenic fraction of textile, plastics, oil, fuels is important for assessing their environmental impact.

### **Life/biomedical sciences**

<sup>14</sup>C is used as a marker of drugs / treatments, to monitor their metabolism and efficacy.

### **Monitoring of nuclear sites**

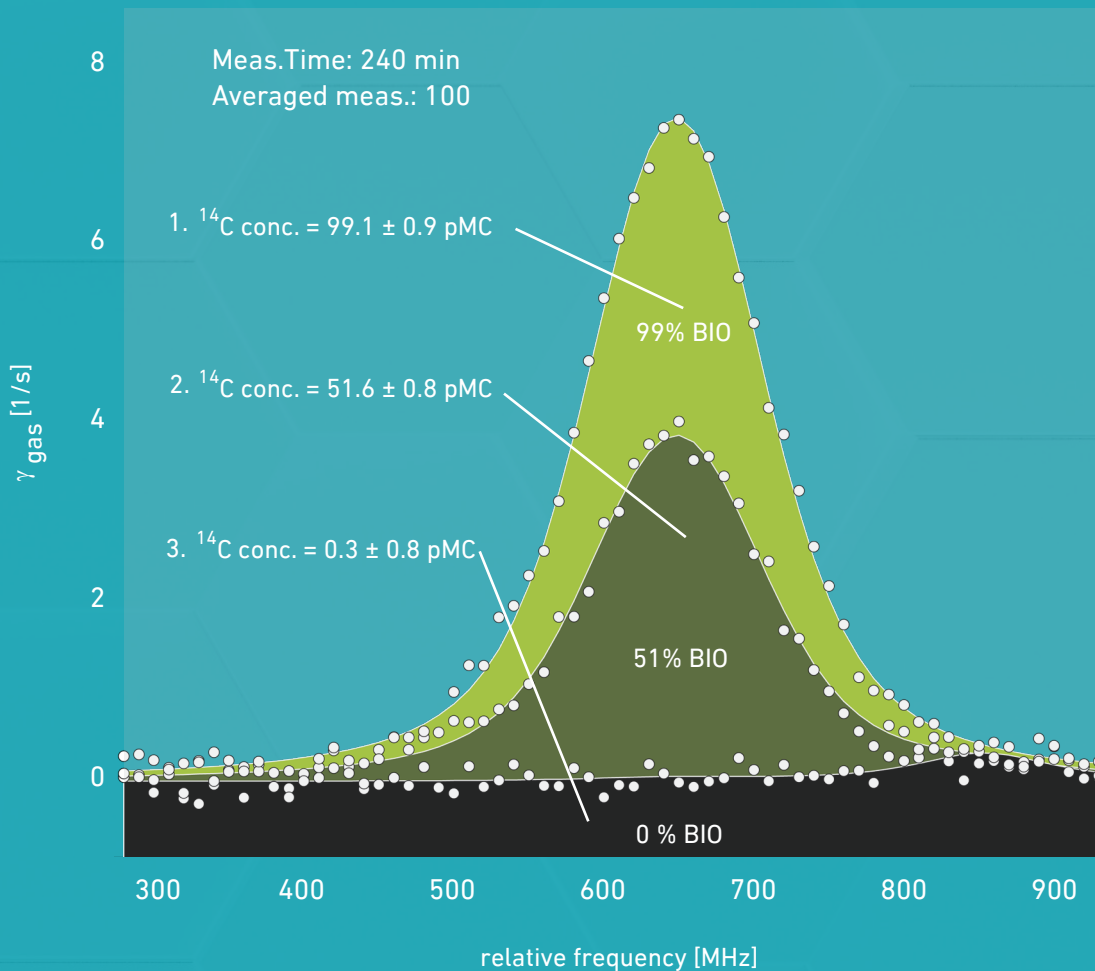
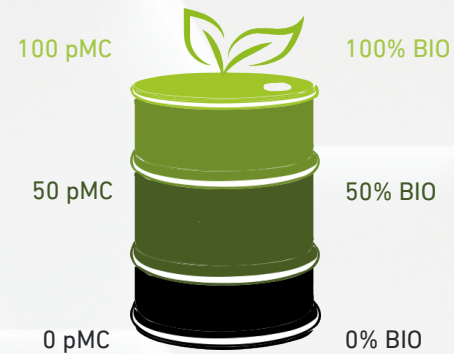
Areas around nuclear power plants / waste repositories has a higher concentration of radiocarbon dioxide, whose radioactivity might raise health issues for resident people.

### **Radiocarbon dating**

The most classic application of radiocarbon measurement for dating archaeological and cultural heritage: the radiocarbon content in a biological sample allows to trace the age of cessation of organic activity.

# OIL & GAS BIOGENIC CONTENT MEASUREMENTS

**<sup>14</sup>C** analyzes the CO<sub>2</sub> gas produced by burning the sample and retrieves the mole fraction of <sup>14</sup>C by measuring the spectral area of a given molecular transition of the <sup>14</sup>CO<sub>2</sub> molecule. If the sample is taken from a modern living being, the measured <sup>14</sup>C mole fraction will be close to the so-called natural abundance or Modern Carbon (MC) mole fraction. This corresponds to 100 percent of Modern Carbon, i.e. 100 pMC. A similar measurement taken on a sample containing only fossil carbon will not show any signal corresponding to the <sup>14</sup>CO<sub>2</sub> transition, since no <sup>14</sup>C is present: this corresponds to 0 pMC.



1. A measurement on a sample of SES biofuel produced from seaweed reveals that the fuel is 99% BIO.
2. A measurement on a biodiesel from ADM confirms the declared percentage of 51% of biogenic component.
3. A measurement on a fossil fuel taken from the gas station reveals a 0% biogenic component.

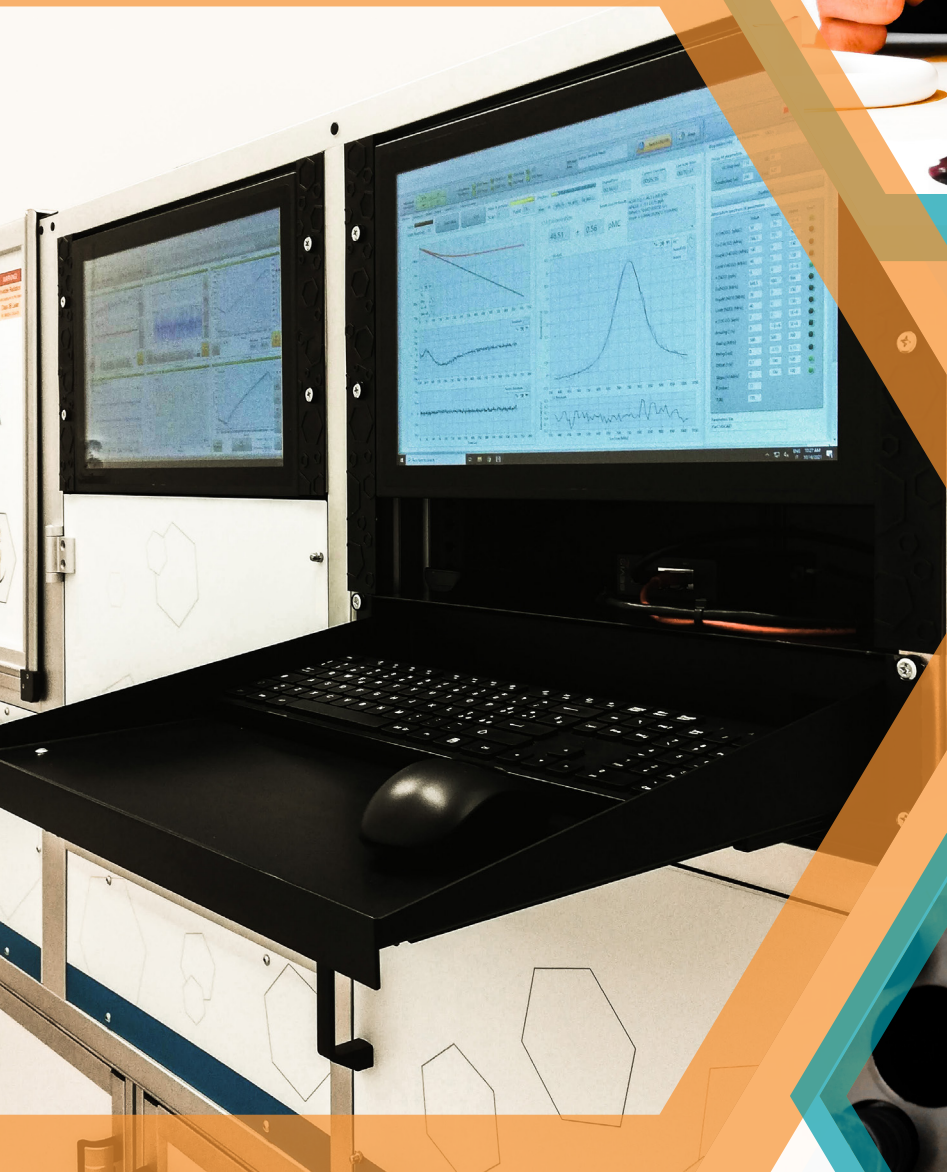
## MEASUREMENT PERFORMANCE

	MIN	TYP	MAX	UNITS	NOTES
Carbon sample mass required	6	8		mg	
N <sub>2</sub> O contamination level		5	10	ppb	
<sup>14</sup> C content precision					
@ 10 minutes avg time	1.0	1.5		pMC	
@ 60 minutes avg time	0.4	0.6		pMC	
@ 240 minutes avg time	0.2	0.3		pMC	
Accuracy	0.2	0.5		%	
Limit of detection	1			pMC	

## SPECIFICATIONS

	MIN	TYP	MAX		NOTES
Power Supply		230		V <sub>ac</sub>	
Absorbed Power		2.5	3	kW	
Weight		600		kg	
Size	200 x 110 x 160			cm	
Warranty	1			year	
Safety Tested to	EN 61326-1 EN 55011 EN 61000-4-2 EN 61000-4-8 EN 61000-4-3				European Council Directives: 2004/108/EC 2006/95/EC







**ppqSense S.r.l.**

Viale Ariosto 492/B, 50019 Sesto Fiorentino FI, Italy

web: [www.ppqsense.it](http://www.ppqsense.it) email: [info@ppqsense.it](mailto:info@ppqsense.it)

Tel.: +39 055 8023943

