

## 论文

### 天然气中金属微量元素的发现及其生态环境意义

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#### 摘要:

为了开展天然气田生态地球化学评价和天然气藏的非常规地球化学勘查研究,首次引进地气测量的抽气采集法采集天然气中的微量元素并获得成功。利用等离子光谱分析法进行检测,发现川西天然气中含有51种微量元素,其属性有碱金属、碱土金属、稀有金属、过渡金属、主族元素、卤素和非金属,以元素周期表上的第四、五、六周期的元素为主。Zn、Ca、K、Na、P、Cu、Mg、Ba、Pb、Fe含量占总量的95%以上,其中以Zn和Ca含量最高,占总量的56.7%,K、Na、P、Cu含量次之。该发现不仅对天然气的成因、烃源、成藏过程的研究以及天然气的利用有重要作用,而且对天然气田上方生态环境的研究具有重要意义。

关键词: [天然气](#); [金属微量元素](#); [抽气法](#); [等离子光谱](#); [农业生态环境](#)

The discovery of metal trace elements in natural gas and its ecologic environmental significance.

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#### Abstract:

We have successfully collected the trace elements in natural gas by the air extracting method used in geogas survey in order to conduct the ecologic geochemical evaluation and the investigation of unconventional geochemical exploration for natural gas reservoirs. Fifty one trace elements in the natural gas of west Sichuan were discovered by using the method of laser plasma spectral analysis. These trace elements are mainly the elements in the 4th, 5th, and 6th periods of the Periodic Table, and their attributes are alkali metals, alkaline earth metals, rare metals, transition metals, main group elements, halogen and nonmetals. The contents of Zn, Ca, K, Na, P, Cu, Mg, Ba, Pb and Fe make up 95% of the total. Among them, the contents of Zn and Ca are the highest, making up 56.7% of the total; the next elements having higher contents are K, Na, P and Cu. This discovery not only plays an important role in the investigation of the origin, the hydrocarbon source, the reservoir forming process and the utility of the natural gas, but also is of great significance for studying the ecologic environment above the gas field.

#### Keywords:

[natural gas](#); [metal trace element](#); [air extracting from gas](#); [plasma spectral analysis](#); [agricultural ecologic environment](#)

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