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**NATIONAL STANDARD OF THE  
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**Determination of the gold adsorption capacity and adsorption  
rate of activated carbon**

活性炭吸附金容量及速率的测定

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### Foreword

This standard is drafted in accordance with the rules given in GB/T 1.1-2009. This standard is proposed by the National Gold Standardization Technical Committee (SAC/TC379). This standard is responsible for drafting units. Zijin Mining Group Co., Ltd. This standard participates in the drafting unit. Changchun Gold Research Institute, Xiamen Zijin Mining & Metallurgy Technology Co., Ltd., Beijing Mining and Metallurgy Research Institute, Shandong National University Gold Co., Ltd., Lingbao Gold Co., Ltd. Gold smelting branch, Henan Zhongyuan Gold Smelter Co., Ltd. The main drafters of this standard. Xia Zhenzhu, Chen Zhuhai, Lin Changlan, Long Xiujia, Yu Jinsheng, Chen Yonghong, Hong Bo, Gao Zhenguang, Liu Haibo, Liu Yongyu, Zhang Lin, Wang Hui, Kong Lingjiang, Du Xiang, Song Yaoyuan, Hu Zhaofeng, Liu Chengxiang. Determination of the Capacity and Rate of Adsorption of Activated Carbon Warning. This standard uses sodium cyanide, is a highly toxic chemicals, to remind users to pay attention to safe operation, waste should be properly safe and safe.

### 1 Scope

China's national standard method for measuring how much gold an activated carbon will hold and how fast it takes it up. It specifies the determination of the adsorption capacity and adsorption rate of coconut shell activated carbon in hydrometallurgical gold extraction, and it applies to evaluating the gold adsorption performance of the carbon used in that process. Almost all the world's gold is now recovered by cyanide leaching followed by adsorption onto activated carbon. The ore is ground, the gold is dissolved as a cyanide complex at concentrations of a few parts per million, and that dilute solution is contacted with granular

carbon which takes the gold out of it. The carbon then carries perhaps a few thousand grams of gold per tonne, from which it is stripped, and the carbon is regenerated and returned to the circuit. Two properties of the carbon govern the plant. Capacity is how much gold a given mass will hold at equilibrium, and it sets how much carbon has to be in circulation; rate is how fast it gets there, and it sets how many adsorption stages are needed and how long the pulp must be held in each. A carbon with high capacity and slow kinetics will look excellent in a laboratory equilibrium test and perform badly in a plant, because in a real circuit the carbon is never at equilibrium. Measuring both is therefore the only honest way to compare carbons, and this standard fixes how both are measured. It carries a warning: the method uses sodium cyanide, which is highly toxic. Issued on 13 October 2016 and in force since 1 September 2017.

This standard specifies the determination method of the capacity and rate of adsorption of coconut shell activated carbon in the wet gold extraction process. This standard applies to the wet gold extraction process used in the coconut shell activated carbon adsorption capacity and the rate of determination, for activated carbon adsorption gold Can be evaluated.

## 2 Terms and definitions

The following terms and definitions apply to this document.

**2.1 Freundlich adsorption isotherm** Freundlichadsorptionisotherm At a constant temperature, the relationship between the amount of adsorbed components per unit mass of adsorbent and the equilibrium concentration of the component is in accordance with Freundlich Adsorption equation, see equation (1).  $Q = kc^n$  or  $\lg Q = n \lg c + \lg k$  (1) Where.  $Q$  - the amount of adsorbed components per unit mass of adsorbent when adsorbed equilibrium;  $c$  - the concentration of the adsorbed component at the time of adsorption equilibrium;  $k, n$  - constant.

**2.2 Adsorption capacity** The amount of adsorbent per unit mass of adsorbent for a given component in a fluid or fluid mixture at a given temperature, concentration or pressure. This standard Quasi-medium, activated carbon adsorption gold capacity refers to the adsorption equilibrium in the gold concentration of 1.0µg/mL unit mass of activated carbon adsorption of gold.

**2.3 Adsorption rate** At a given temperature, concentration or pressure, the amount of adsorbent adsorbed per unit of time for a given component. In this standard, the activity The carbon adsorption rate of carbon refers to the amount of adsorbed gold per unit mass of activated carbon adsorbed for 60 min in a solution with a gold concentration of 10.0 µg/mL. Determination of Adsorption Gold Capacity

**3.1 Method Summary** In the constant temperature conditions, the sample in a certain concentration of gold-containing solution to achieve adsorption equilibrium, the atomic

absorption spectrometry determination of adsorption liquid Gold concentration, drawn Freundlich adsorption isotherm, calculated by the activated carbon adsorption gold capacity.

3.2 Reagents Unless otherwise stated, analytical pure reagents and deionized water or comparable purity of water are used in the analysis.

3.2.1 sponge gold. mass fraction  $\geq 99.99\%$ .

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