

## Engineering Data Sheet

8029

### Product: Anso**rb**™ Adsorbent for Arsenic, Hexavalent Chromium, and Selenium Removal

#### Product Description

Anso**rb**™ is a proprietary, mixed-metal oxide adsorbent. Its unique hydrothermal treatment produces a molecular structure with a very high adsorbent capacity for aqueous anions. Anso**rb**™ adsorbent is highly selective for divalent and trivalent anions over monovalent anions. The product is currently available as a fine, free-flowing powder. The material's excellent filtration properties make it easy to separate the adsorbent powder from the purified water stream. Anso**rb**™ adsorbent is stable and effective in the alkaline pH range where anion adsorption is typically difficult.

#### Product Applications

Because of its extremely high capacity and selectivity for higher valence anions, Anso**rb**™ adsorbent is ideal for a wide range of adsorbent applications. Typical uses include:

- ◆ Removal of hexavalent chromium from metal finishing rinse waters
- ◆ Waste treatment of spent electroless metal baths and rinses
- ◆ Treatment of inorganic wood preserving wastewaters
- ◆ Removal of organic color bodies from plant effluent or process solutions
- ◆ Removal of metal complexed cyanides from waste streams

Anso**rb**™ adsorbent also has excellent adsorptive capacity for the priority pollutants selenium and arsenic. High adsorption loadings are obtained even at extremely low solution concentrations (10 to 20 ppb).

Anso**rb**™ adsorbent exhibits strong preference for adsorbing problem metal oxide anions such as chromate, arsenate, arsenite, selenate, and selenite. Nontoxic background anions such as sulfate, phosphate, and carbonate are less preferred.

The accompanying table and graphs contain examples of the high adsorbent capacity and selectivity of Anso**rb**™ adsorbent.

Because both selenium and arsenic exist in water as anions, Anso**rb**™ is the ideal adsorbent for removing these

highly toxic substances. The EPA drinking water standards for both species are very low: 0.05 mg/L for arsenic and 0.01 mg/L for selenium. Even at concentrations this low, Anso**rb**™ has an extremely high adsorbent capacity. For adsorption of the arsenic (III) species, the capacity of Anso**rb**™ is greater than 5 weight percent at 5 ppb. When selenium is present with a high sulfate background, Anso**rb**™ is still effective. Its anion adsorption capacity of up to 5.5 meq/gram allows it to cost effectively remove both species from solution.

#### Typical Product Properties

##### Physical Analysis:

Surface Area	170 m <sup>2</sup> /g
Total pore volume	0.3 cm <sup>3</sup> /g
Average pore diameter	55 angstroms
Skeletal density	2.9 g/cm <sup>2</sup>
Particle size	10 μm
Loose bulk density	30 lb/ft <sup>3</sup>

##### Chemical Analysis:

Mixed-metal oxide (proprietary formula)	>98.5 wt. %
SiO <sub>2</sub>	<0.2 wt. %
CaO	<0.5 wt. %
Na <sub>2</sub> O	<0.2 wt. %
Fe <sub>2</sub> O <sub>3</sub>	<0.1 wt. %

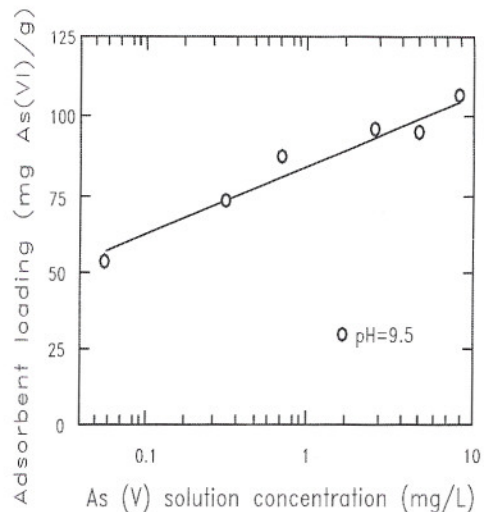
CONTAMINANT	CAPACITY	
	mg/g	meq/g
SO <sub>4</sub>	210	(4.4)
Cu-Citrate	200	(1.6)
PO <sub>4</sub>	184	(3.9)
Ni-EDTA	180	(1.0)
Complexed CN	167	(4.5)
CO <sub>3</sub>	150	(5.0)
Cu-EDTA	113	(0.6)
As(V)	110	(3.0)
Se(VI)	100	(2.8)
Cr(VI)	100	(3.9)
Theoretical for Anso <b>rb</b> ™ adsorbent		(5.5)

From the Engineering Department of

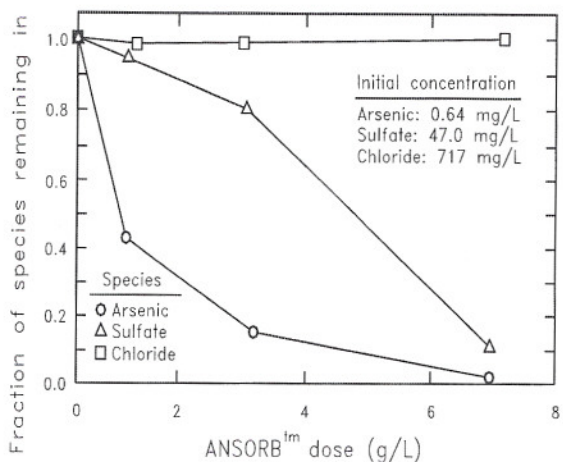
**WaterSmart**  
Environmental, Inc.



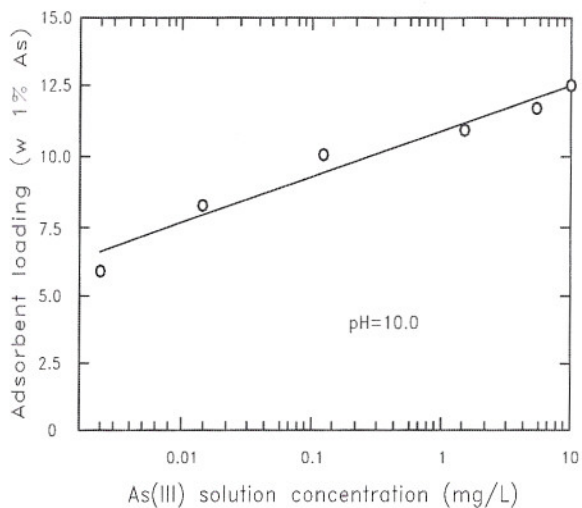
Arsenic(V) Removal Using ANSORB<sup>tm</sup> Adsorbent



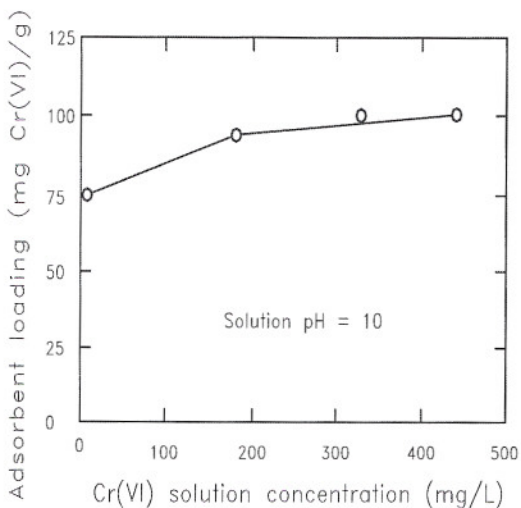
ANSORB<sup>tm</sup> Adsorbent Selectivity for Divalent Anions over Monovalent Anions



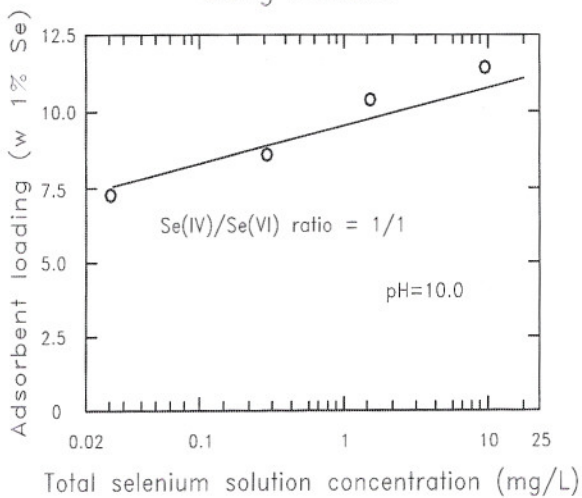
Arsenic(III) Removal Using ANSORB<sup>tm</sup>



Cr(VI) Removal Using ANSORB<sup>tm</sup> Adsorbent



Combined Removal: Se(IV) and Se(VI) Using ANSORB<sup>tm</sup>



Combined Removal: Se(IV) and Se(VI) Using ANSORB<sup>tm</sup> Adsorbent

