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**United States Patent** [19]  
**Martin et al.**

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- [54] **HALO-ZEO-TYPE MATERIALS**
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**Related U.S. Application Data**

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- [51] **Int. Cl.<sup>6</sup>** ..... **C01G 3/05**; C01G 9/04
- [52] **U.S. Cl.** ..... **423/463**; 423/470; 423/472
- [58] **Field of Search** ..... 423/470, 472, 423/463, 700, 705, 713

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[57] **ABSTRACT**

Disclosed herein is a novel class of halide-based framework solids based on a  $Zn_nCl_{2n}$  parentage, as zeo-types are related to  $Si_nO_{2n}$ . These materials, referred to as halo zeo-type materials, constructed from Lewis acidic and redox active tetrahedral building blocks, should augment the size and shape selectivity characteristics of zeolites. One example of these materials, compound CZX-1, has the formula  $[NH(CH_3)_3]_3CuZn_5Cl_{12}$ . Another example of these materials, compound CZX-2, has the formula  $[NH_2(CH_2CH_3)_2]_2CuZn_5Cl_{12}$ . Compound CZX-3 has the formula  $[H_2N(CH_3)_2]_n[Cu_nZn_{6-n}Cl_{12}]$ , wherein n may be 1 or 2. Compound CZX-4 has the formula  $[A]_n[Cu_2Zn_2Cl_7]$ , wherein A may be  $H_3NCH_3^+$  or  $Rb^+$ . The invention also relates to colloidal suspensions which may utilize the halide-based compounds.

**5 Claims, 3 Drawing Sheets**

