Solid solution barium–strontium chlorides with tunable ammonia desorption properties and superior storage capacity

Metal halide ammines are very attractive materials for ammonia absorption and storage—applications where the practically accessible or usable gravimetric and volumetric storage densities are of critical importance. Here we present, that by combining advanced computational materials prediction with spray drying and in situ thermogravimetric and structural characterization, we synthesize a range of new, stable barium-strontium chloride solid solutions with superior ammonia storage densities. By tuning the barium/strontium ratio, different crystallographic phases and compositions can be obtained with different ammonia ab- and desorption properties. In particular it is shown, that in the molar range of 35–50% barium and 65–50% strontium, stable materials can be produced with a practically usable ammonia density (both volumetric and gravimetric) that is higher than any of the pure metal halides, and with a practically accessible volumetric ammonia densities in excess of 99% of liquid ammonia.

General information
State: Published
Organisations: Department of Physics, Center for Atomic-scale Materials Design, Department of Energy Conversion and Storage, Atomic Scale Materials Modelling, Amminex Emissions Technology A/S
Contributors: Bialy, A., Jensen, P. B., Blanchard, D., Vegge, T., Quaade, U. J.
Pages: 32–36
Publication date: 2015
Peer-reviewed: Yes

Publication information
Journal: Journal of Solid State Chemistry
Volume: 221
ISSN (Print): 0022-4596
Ratings:
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.2 SJR 0.632 SNIP 0.805
Web of Science (2017): Impact factor 2.179
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.09 SJR 0.618 SNIP 0.871
Web of Science (2016): Impact factor 2.299
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 2.18 SJR 0.679 SNIP 0.956
Web of Science (2015): Impact factor 2.265
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.35 SJR 0.799 SNIP 1.058
Web of Science (2014): Impact factor 2.133
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.22 SJR 0.769 SNIP 1.036
Web of Science (2013): Impact factor 2.2
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.27 SJR 0.931 SNIP 1.184
Web of Science (2012): Impact factor 2.04
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 2.5 SJR 1.004 SNIP 1.299
Web of Science (2011): Impact factor 2.159
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.068 SNIP 1.202
Web of Science (2010): Impact factor 2.261
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.057 SNIP 1.325
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.988 SNIP 1.22
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.066 SNIP 1.317
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.033 SNIP 1.319
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.768 SNIP 1.105
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 0.751 SNIP 1.186
Scopus rating (2003): SJR 0.802 SNIP 1.093
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.871 SNIP 1.234
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.899 SNIP 1.25
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.887 SNIP 1.233
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.951 SNIP 1.234
Original language: English
Keywords: Ammonia storage, Hydrogen storage, Solid solutions, Metal halides
DOIs:
10.1016/j.jssc.2014.09.014
Source: PublicationPreSubmission
Source-ID: 100671671
Research output: Research - peer-review › Journal article – Annual report year: 2015