A-16

STRUCTURAL AND MAGNETIC STUDIES ON NEW CESIUM AND BARIUM FLUOROMETALLATES OF 3d TRANSITION ELEMENTS

D. Babel, E. Herdtweck, H. Holler, R. E. Schmidt and S. Kummer

Fachbereich Chemie der Philipps-Universität, Hans-Meerwein-Strasse, D-3550 Marburg (F.R.G.)

Looking for compounds Cs_2MF_4 the cesium richest composition we found at M(II) = Co, Ni was $Cs_7M_4F_{15}$. X-ray single crystal work revealed a layer structure ($P2_1/c$, Z=2), built up from face-sharing double octahedra M_2F_9 which are mutually connected via three of their vertices. Some interatomic distances are given in Table I, along with data of six novel compounds $Ba_2AM_2F_9$ ($R\bar{3}m$, Z=3). The puckered layer structure of the latter consists of single octahedra, sharing three corners in a fac-position. It derives from the hexagonal perovskite structure of $CsCoF_3$ by omitting the central cations within the groups of three face-sharing octahedra.

The occurence of three structure types at quaternary fluorides $BaM^{II}M^{III}F_7$ is discussed as dependent on r^{II}/r^{III} and r^{II}/r_F radius ratios. The magnetic properties of some nickel(II), manganese(II) and iron(III) compounds exhibiting one of the structures mentioned are reported.

Table I:

	a(pm)	b(pm)	c(pm)	β(°)	octahedral M-F (pm)		
					term.	bridg.	mean
$Ba_2RbFe_2F_9$	594.9		2o83.7		199.4	213.2	2o6.3
$Ba_2CsCo_2F_9$	593.1		2131.8		198.8	211.4	2o5.1
$Cs_7Co_4F_{15}$	788.3	1o96.6	1164.9	92.59	197.7	2o9.4	2o6.5
$Ba_2KNi_2F_9$	577.5		2o75.6		196.1	2o6.4	2o1.3
$Ba_2RbNi_2F_9$	58o.1		2o99.4		196.o	2o6.4	2o1.2
$Ba_2CsNi_2F_9$	585.5		212o.9		196.9	2o7.1	2o2.o
$Cs_7Ni_4F_{15}$	787.2	1o89.7	1149.5	92.74	196.3	2o6.1	2o3.7
$Ba_2CsZn_2F_9$	59o.5		2127.9		195.8	212.7	2o4.3