gridlocks – can you unlock the grid?

M^{2+} (aq) ions

Before you answer the gridlock below fill in the table of M^{2+} ions:

$[Cu(H_2O)_6]^{2+}$ green $Fe(H_2O)_4(OH)_2$ blue

Hexaaqua M^{2+} ions	Colour of aqueous M^{2+} ion	Precipitate with NaOH(aq)	Colour of hydroxide precipitate
$[Fe(H_2O)_6]^{2+}$			green
	blue	$Cu(H_2O)_4(OH)_2$	blue
$[Co(H_2O)_6]^{2+}$	pink	$Co(H_2O)_4(OH)_2$	green-blue
$[Cr(H_2O)_6]^{2+}$		$Cr(H_2O)_3(OH)_3$ (Cr^{2+} oxidises in air to Cr^{3+})	green (Cr^{2+} oxidises in air to Cr^{3+})

Gridlock 1

Each row, column and 2 x 2 box contains information about the four aqueous ions listed. Use your problem solving skills and the answers in the table above to fill in the blank boxes.

hexaaqua M^{2+} ions		colour of aqueous M^{2+} ion	
	$[Fe(H_2O)_6]^{2+}$		blue
$[Cr(H_2O)_6]^{2+}$			green
		$[Cr(H_2O)_6]^{2+}$	
blue			$[Co(H_2O)_6]^{2+}$
colour of aqueous M^{2+} ion		hexaaqua M^{2+} ions	

gridlocks – can you unlock the grid?

Gridlock 2

Each row, column and 2 x 2 box contains information about the four metals listed.

hexaaqua M^{2+} ions		colour of aqueous M^{2+} ion	
$[Cu(H_2O)_6]^{2+}$			green
			green (Cr^{2+} oxidises in air to Cr^{3+})
$Co(H_2O)_4(OH)_2$			

precipitate with NaOH(aq)	colour of hydroxide precipitate

Gridlock 3

Each row, column and 2 x 2 box contains information about the four metals listed.

hexaaqua M^{2+} ions		colour of aqueous M^{2+} ion	
$[Cu(H_2O)_6]^{2+}$			green
	$Co(H_2O)_4(OH)_2$		green (Cr^{2+} oxidises in air to Cr^{3+})

precipitate with NaOH(aq)	colour of hydroxide precipitate

M^{2+} (aq) ions – answers

Hexaaqua M^{2+} ions	Colour of aqueous M^{2+} ion	Precipitate with NaOH(aq)	Colour of hydroxide precipitate
$[Fe(H_2O)_6]^{2+}$	**green**	**$Fe(H_2O)_4(OH)_2$**	green
$[Cu(H_2O)_6]^{2+}$	blue	$Cu(H_2O)_4(OH)_2$	blue
$[Co(H_2O)_6]^{2+}$	pink	$Co(H_2O)_4(OH)_2$	green-blue
$[Cr(H_2O)_6]^{2+}$	**blue**	$Cr(H_2O)_3(OH)_3$ (Cr^{2+} oxidises in air to Cr^{3+})	green (Cr^{2+} oxidises in air to Cr^{3+})

Gridlock 1 – answers

hexaaqua M^{2+} ions		colour of aqueous M^{2+} ion	
$[Co(H_2O)_6]^{2+}$	$[Fe(H_2O)_6]^{2+}$	blue	blue
$[Cr(H_2O)_6]^{2+}$	$[Cu(H_2O)_6]^{2+}$	pink	green
green	pink	$[Cr(H_2O)_6]^{2+}$	$[Cu(H_2O)_6]^{2+}$
blue	blue	$[Fe(H_2O)_6]^{2+}$	$[Co(H_2O)_6]^{2+}$
colour of aqueous M^{2+} ion		hexaaqua M^{2+} ions	

Gridlock 2 – answers

hexaaqua M^{2+} ions		colour of aqueous M^{2+} ion	
$[Cu(H_2O)_6]^{2+}$	$[Co(H_2O)_6]^{2+}$	blue	green
$[Cr(H_2O)_6]^{2+}$	$[Fe(H_2O)_6]^{2+}$	blue	pink
$Fe(H_2O)_4(OH)_2$	$Cu(H_2O)_4(OH)_2$	green-blue	green (Cr^{2+} oxidises in air to Cr^{3+})
$Co(H_2O)_4(OH)_2$	$Cr(H_2O)_3(OH)_3$ (Cr^{2+} oxidises in air to Cr^{3+})	green	blue
precipitate with NaOH(aq)		colour of hydroxide precipitate	

Gridlock 3 – answers

hexaaqua M^{2+} ions		colour of aqueous M^{2+} ion	
$[Cu(H_2O)_6]^{2+}$	$[Cr(H_2O)_6]^{2+}$	pink	green
$[Co(H_2O)_6]^{2+}$	$[Fe(H_2O)_6]^{2+}$	blue	blue
$Fe(H_2O)_4(OH)_2$	$Co(H_2O)_4(OH)_2$	blue	green (Cr^{2+} oxidises in air to Cr^{3+})
$Cr(H_2O)_3(OH)_3$ (Cr^{2+} oxidises in air to Cr^{3+})	$Cu(H_2O)_4(OH)_2$	green	green-blue
precipitate with NaOH(aq)		colour of hydroxide precipitate	