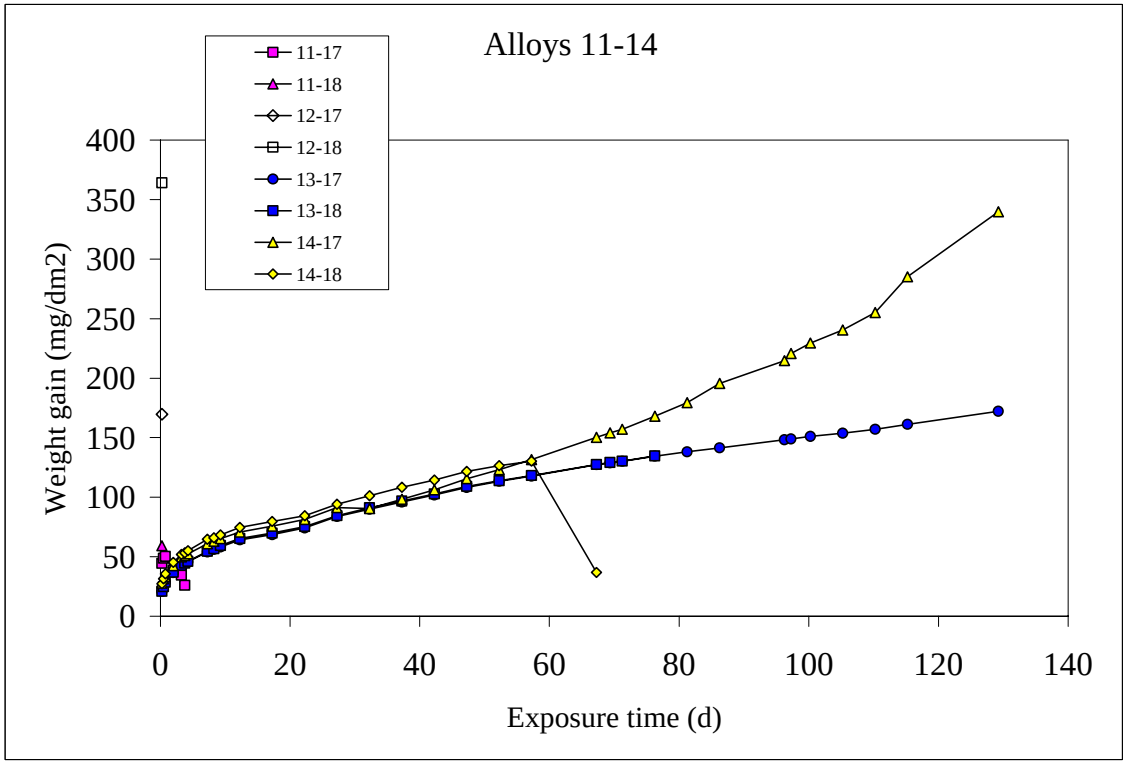
500°C Steam (Westinghouse)
ZrFeCr Alloys



Alloy	Sample	Gain(1)	Gain(2)	Gain(3)	Gain(4)	Gain(5)	Gain(6)	Gain(7)	Gain(8)	Gain(9)	Gain(10)
	days	0.25	0.50	0.75	2.00	3.25	3.75	4.25	7.25	8.25	9.25
Zr-0.2Fe-0.1Cr	11-17	44.3	48.7	50.1	38.7	34.5	25.9				
Zr-0.2Fe-0.1Cr	11-18	59.1									
Zr-0.2Fe-0.1Cr	12-17	169.7									
Zr-0.2Fe-0.1Cr	12-18	364.0									
Zr-0.4Fe-0.2Cr	13-17	20.8	24.6	28.2	36.6	42.6	44.4	45.7	54.0	56.2	58.1
Zr-0.4Fe-0.2Cr	13-18	21.0	24.8	28.6	36.9	42.8	44.5	46.1	54.4	56.7	59.3
Zr-0.4Fe-0.2Cr	14-17	27.7	31.4	33.2	42.4	49.9	50.9	52.4	60.7	63.0	65.1
Zr-0.4Fe-0.2Cr	14-18	27.3	31.4	35.6	45.1	51.9	53.1	54.9	64.6	65.8	68.2

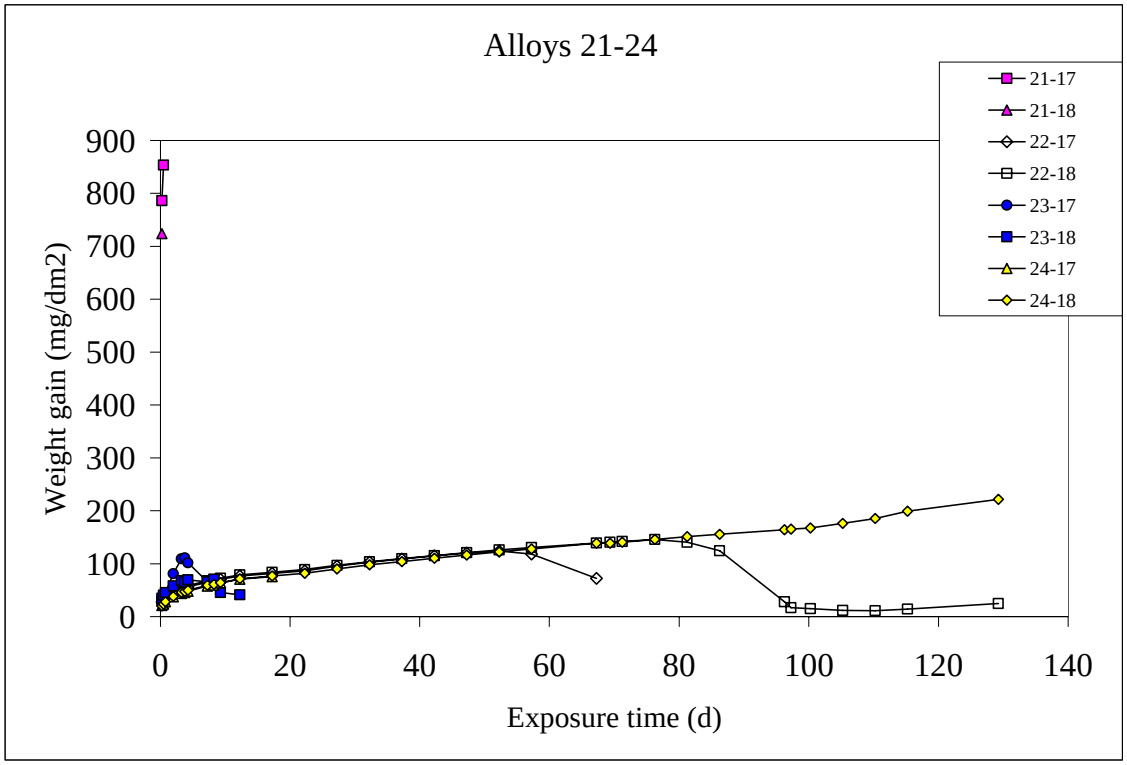
Alloy	Sample	Gain(11)	Gain(12)	Gain(13)	Gain(14)	Gain(15)	Gain(16)	Gain(17)	Gain(18)
	days	12.25	17.25	22.25	27.25	32.25	37.25	42.25	47.25
Zr-0.2Fe-0.1Cr	11-17								
Zr-0.2Fe-0.1Cr	11-18								
Zr-0.2Fe-0.1Cr	12-17								
Zr-0.2Fe-0.1Cr	12-18								
Zr-0.4Fe-0.2Cr	13-17	64.2	68.5	74.1	83.8	90.0	96.0	101.8	108.2
Zr-0.4Fe-0.2Cr	13-18	65.3	69.8	75.3	84.4	91.1	96.7	102.6	109.0
Zr-0.4Fe-0.2Cr	14-17	70.7	75.7	81.3	91.2	90.5	98.3	106.3	115.5
Zr-0.4Fe-0.2Cr	14-18	74.6	79.7	84.5	94.1	101.2	108.4	114.4	121.7

ZrFeCr Alloys (conti.)

Alloy	Sample	Gain(20)	Gain(22)	Gain(23)	Gain(24)	Gain(25)	Gain(26)	Gain(27)	Gain(28)	Gain(29)
	days	57.25	67.25	69.33	71.25	76.25	81.25	86.25	96.25	97.25
Zr-0.2Fe-0.1Cr	11-17									
Zr-0.2Fe-0.1Cr	11-18									
Zr-0.2Fe-0.1Cr	12-17									
Zr-0.2Fe-0.1Cr	12-18									
Zr-0.4Fe-0.2Cr	13-17	117.7	127.3	128.8	130.1	134.5	138.0	141.4	148.2	148.9
Zr-0.4Fe-0.2Cr	13-18	118.2	127.4	129.1	130.3	134.6				
Zr-0.4Fe-0.2Cr	14-17	131.7	150.3	154.0	157.0	168.0	179.4	195.6	214.8	220.7
Zr-0.4Fe-0.2Cr	14-18	130.4	36.7							

Alloy	Sample	Gain(30)	Gain(31)	Gain(32)	Gain(33)	Gain(34)	
	days	100.25	105.25	110.25	115.25	129.3	mg/dm2
Zr-0.2Fe-0.1Cr	11-17						mg/dm2
Zr-0.2Fe-0.1Cr	11-18						mg/dm2
Zr-0.2Fe-0.1Cr	12-17						mg/dm2
Zr-0.2Fe-0.1Cr	12-18						mg/dm2
Zr-0.4Fe-0.2Cr	13-17	151.0	153.7	157.1	161.2	172.2	mg/dm2
Zr-0.4Fe-0.2Cr	13-18						mg/dm2
Zr-0.4Fe-0.2Cr	14-17	229.5	240.5	255.1	285.1	339.9	mg/dm2
Zr-0.4Fe-0.2Cr	14-18						mg/dm2

ZrCrFe Alloys (Steam, W)



Alloy	Sample	Gain(1)	Gain(2)	Gain(3)	Gain(4)	Gain(5)	Gain(6)	Gain(7)	Gain(8)	Gain(9)
	days	0.25	0.50	0.75	2.00	3.25	3.75	4.25	7.25	8.25
Zr-0.5Cr	21-17	786.3	853.6							
Zr-0.5Cr	21-18	723.9								
Zr-0.5Cr-0.2Fe	22-17	27.6	32.1	36.6	46.3	52.5	54.7	56.5	64.7	67.2
Zr-0.5Cr-0.2Fe	22-18	29.5	34.1	39.0	48.4	55.2	56.9	58.9	67.6	69.8
Zr-1.0Cr	23-17	31.5	37.0	44.1	81.1	109.3	110.9	101.6	65.9	
Zr-1.0Cr	23-18	34.8	40.4	45.1	58.0	67.9	65.7	69.6	65.3	70.7
Zr-1.0Cr-0.2Fe	24-17	21.0	23.4	28.0	37.4	43.9	45.5	48.0	57.8	59.4
Zr-1.0Cr-0.2Fe	24-18	20.2	23.6	28.2	38.0	45.8	47.6	49.7	58.9	61.1

Alloy	Sample	Gain(10)	Gain(11)	Gain(12)	Gain(13)	Gain(14)	Gain(15)	Gain(16)	Gain(17)
	days	9.25	12.25	17.25	22.25	27.25	32.25	37.25	42.25
Zr-0.5Cr	21-17								
Zr-0.5Cr	21-18								
Zr-0.5Cr-0.2Fe	22-17	70.4	76.7	81.5	86.5	95.4	102.9	108.9	114.7
Zr-0.5Cr-0.2Fe	22-18	72.5	78.8	83.6	88.8	96.8	103.7	109.4	115.1
Zr-1.0Cr	23-17								
Zr-1.0Cr	23-18	45.6	40.9						
Zr-1.0Cr-0.2Fe	24-17	63.4	70.6	75.6					
Zr-1.0Cr-0.2Fe	24-18	64.1	71.4	76.7	81.8	90.1	97.9	103.8	110.1

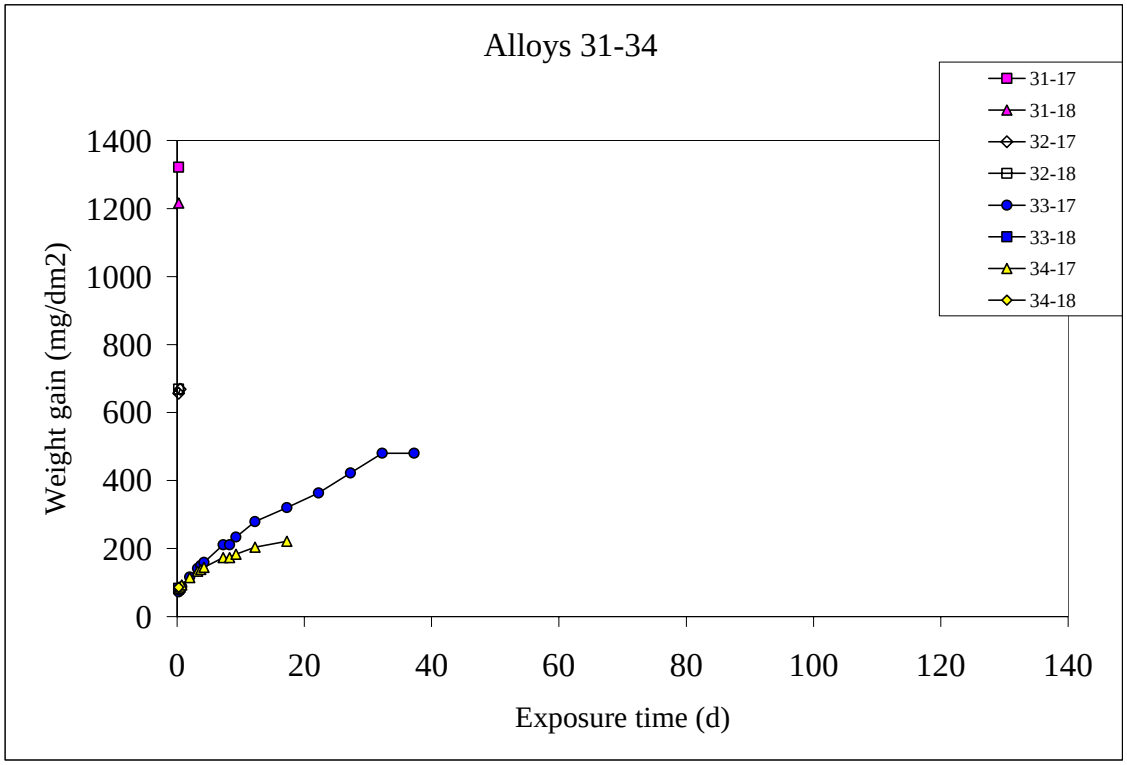
ZrCrFe Alloys (conti.)

Alloy	Sample	Gain(18)	Gain(19)	Gain(20)	Gain(22)	Gain(23)	Gain(24)	Gain(25)
	days	47.25	52.25	57.25	67.25	69.33	71.25	76.25
Zr-0.5Cr	21-17							
Zr-0.5Cr	21-18							
Zr-0.5Cr-0.2Fe	22-17	120.0	123.6	118.1	72.1			
Zr-0.5Cr-0.2Fe	22-18	120.6	125.8	130.6	139.2	140.5	142.0	145.8
Zr-1.0Cr	23-17							
Zr-1.0Cr	23-18							
Zr-1.0Cr-0.2Fe	24-17							
Zr-1.0Cr-0.2Fe	24-18	116.2	122.3	127.9	138.7	138.7	140.6	146.0

Alloy	Sample	Gain(26)	Gain(27)	Gain(28)	Gain(29)	Gain(30)	Gain(31)	Gain(32)
	days	81.25	86.25	96.25	97.25	100.25	105.25	110.25
Zr-0.5Cr	21-17							
Zr-0.5Cr	21-18							
Zr-0.5Cr-0.2Fe	22-17							
Zr-0.5Cr-0.2Fe	22-18	140.8	124.6	28.0	16.8	14.8	11.5	11.3
Zr-1.0Cr	23-17							
Zr-1.0Cr	23-18							
Zr-1.0Cr-0.2Fe	24-17							
Zr-1.0Cr-0.2Fe	24-18	150.9	155.6	164.1	165.2	167.6	175.9	185.5

Alloy	Sample	Gain(33)	Gain(34)	
	days	115.25	129.3	
Zr-0.5Cr	21-17			mg/dm2
Zr-0.5Cr	21-18			mg/dm2
Zr-0.5Cr-0.2Fe	22-17			mg/dm2
Zr-0.5Cr-0.2Fe	22-18	14.1	24.7	mg/dm2
Zr-1.0Cr	23-17			mg/dm2
Zr-1.0Cr	23-18			mg/dm2
Zr-1.0Cr-0.2Fe	24-17			mg/dm2
Zr-1.0Cr-0.2Fe	24-18	199.2	221.7	mg/dm2

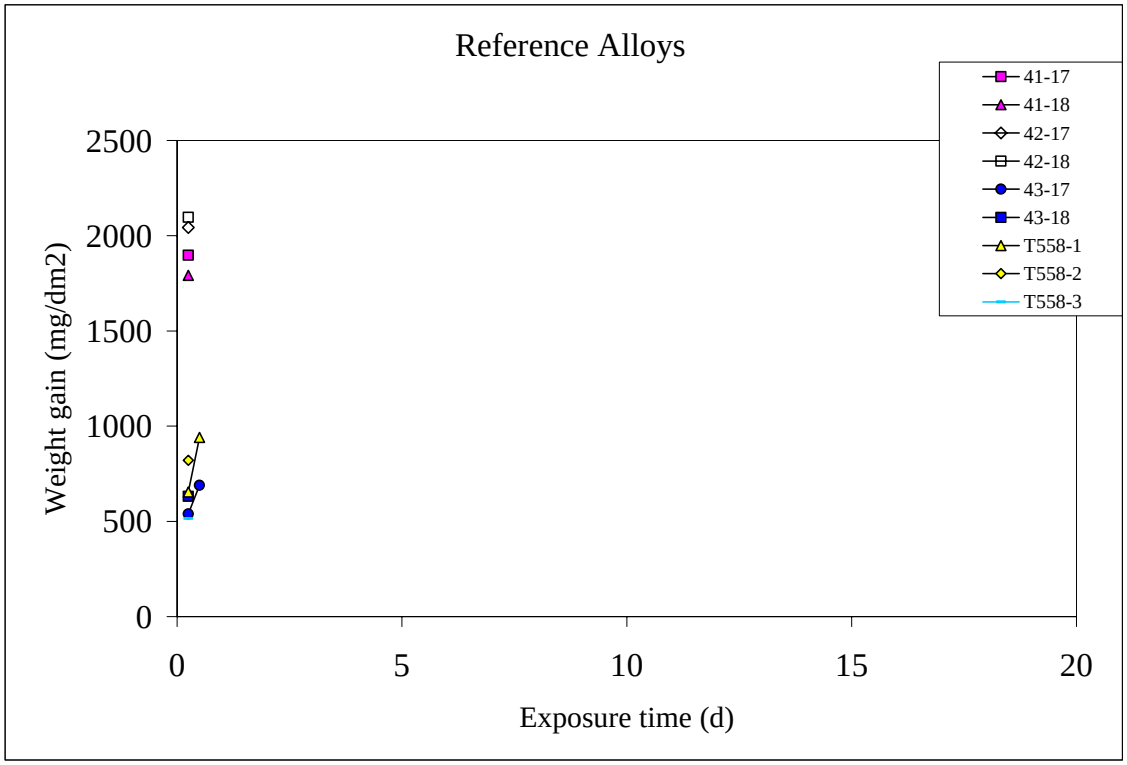
ZrCuMo Alloys (Steam, W)



Alloy	Sample	Gain(1)	Gain(2)	Gain(3)	Gain(4)	Gain(5)	Gain(6)	Gain(7)	Gain(8)	Gain(9)
	days	0.25	0.50	0.75	2.00	3.25	3.75	4.25	7.25	8.25
Zr-0.5Cu	31-17	1321.4								
Zr-0.5Cu	31-18	1216.2								
Zr-0.5Cu-0.5Mo	32-17	656.4	668.3							
Zr-0.5Cu-0.5Mo	32-18	668.9								
Zr-1.0Cu	33-17	72.6	77.4	87.0	116.6	141.5	150.1	159.5	211.3	211.3
Zr-1.0Cu	33-18	83.4								
Zr-1.0Cu-0.5Mo	34-17	81.9	86.9	92.9	114.8	133.5	138.3	144.6	173.3	173.2
Zr-1.0Cu-0.5Mo	34-18	86.1								

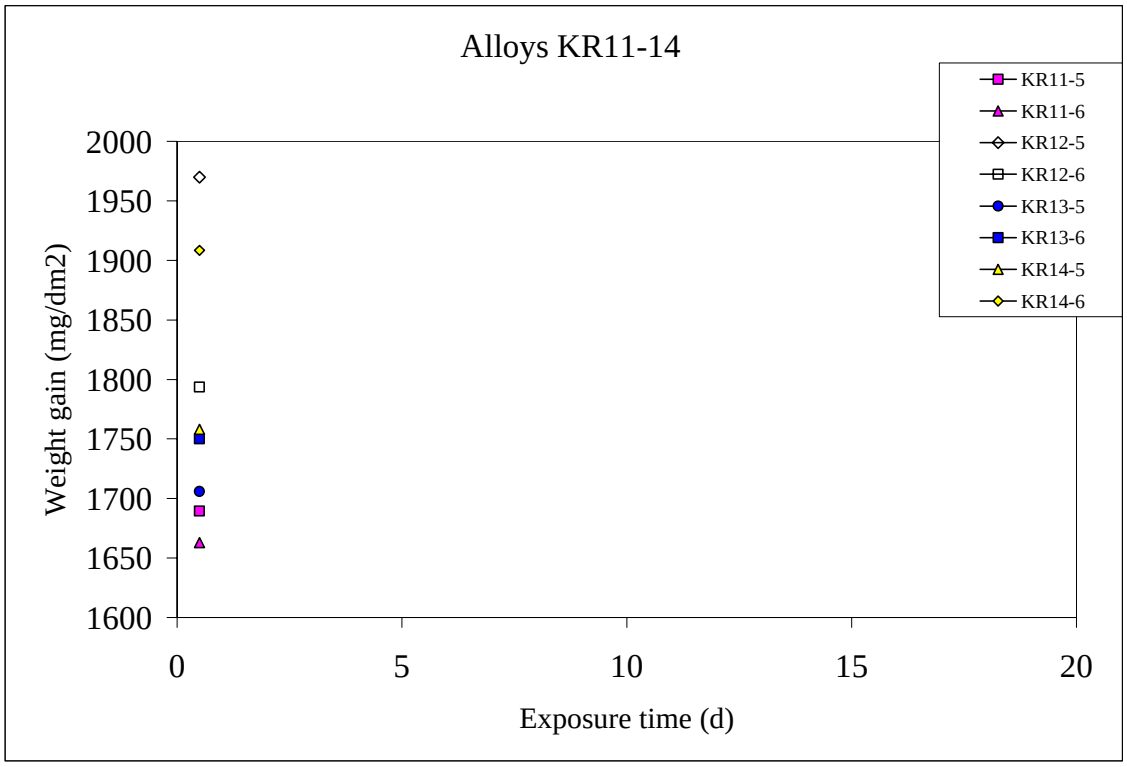
Alloy	Sample	Gain(10)	Gain(11)	Gain(12)	Gain(13)	Gain(14)	Gain(15)	
	days	9.25	12.25	17.25	22.25	27.25	32.25	
Zr-0.5Cu	31-17							mg/dm2
Zr-0.5Cu	31-18							mg/dm2
Zr-0.5Cu-0.5Mo	32-17							mg/dm2
Zr-0.5Cu-0.5Mo	32-18							mg/dm2
Zr-1.0Cu	33-17	234.0	279.3	320.2	363.4	422.5	480.7	mg/dm2
Zr-1.0Cu	33-18							mg/dm2
Zr-1.0Cu-0.5Mo	34-17	183.3	204.4	221.4				mg/dm2
Zr-1.0Cu-0.5Mo	34-18							mg/dm2

Reference Alloys (Steam, W)



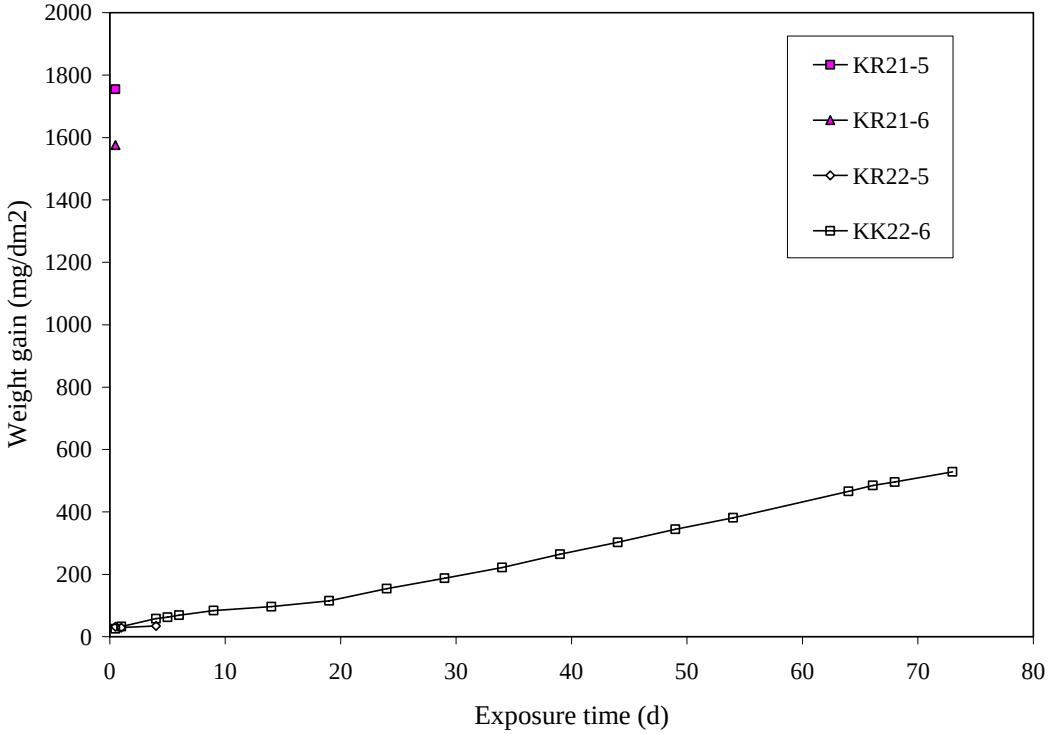
Alloy	Sample	Gain(1)	Gain(2)	Gain(3)
		0.25	0.50	0.75
Sponge Zr	41-17	1897.5		mg/dm2
Sponge Zr	41-18	1791.6		mg/dm2
Crystal Bar Zr	42-17	2043.5		mg/dm2
Crystal Bar Zr	42-18	2097.0		mg/dm2
Zircaloy-4	43-17	539.2	690.0	mg/dm2
Zircaloy-4	43-18	631.3		mg/dm2
Zr-4 95-7051	T558-1	653.9	941.2	mg/dm2
Zr-4 95-7051	T558-2	820.7		mg/dm2
Zr-4 95-7051	T558-3	514.9		mg/dm2

ZrSn Alloys (Steam, W)



Alloy	Sample days	Gain(1) 0.5	Gain(2) 1.0
Zr-0.2Sn	KR11-5	1689.4	mg/dm2
Zr-0.2Sn	KR11-6	1662.8	mg/dm2
Zr-0.4Sn	KR12-5	1969.8	mg/dm2
Zr-0.4Sn	KR12-6	1793.6	mg/dm2
Zr-0.8Sn	KR13-5	1705.8	mg/dm2
Zr-0.8Sn	KR13-6	1750.1	mg/dm2
Zr-1.2Sn	KR14-5	1758.1	mg/dm2
Zr-1.2Sn	KR14-6	1908.5	mg/dm2

ZrNb Alloys (< 0.5Nb) (Steam, W)

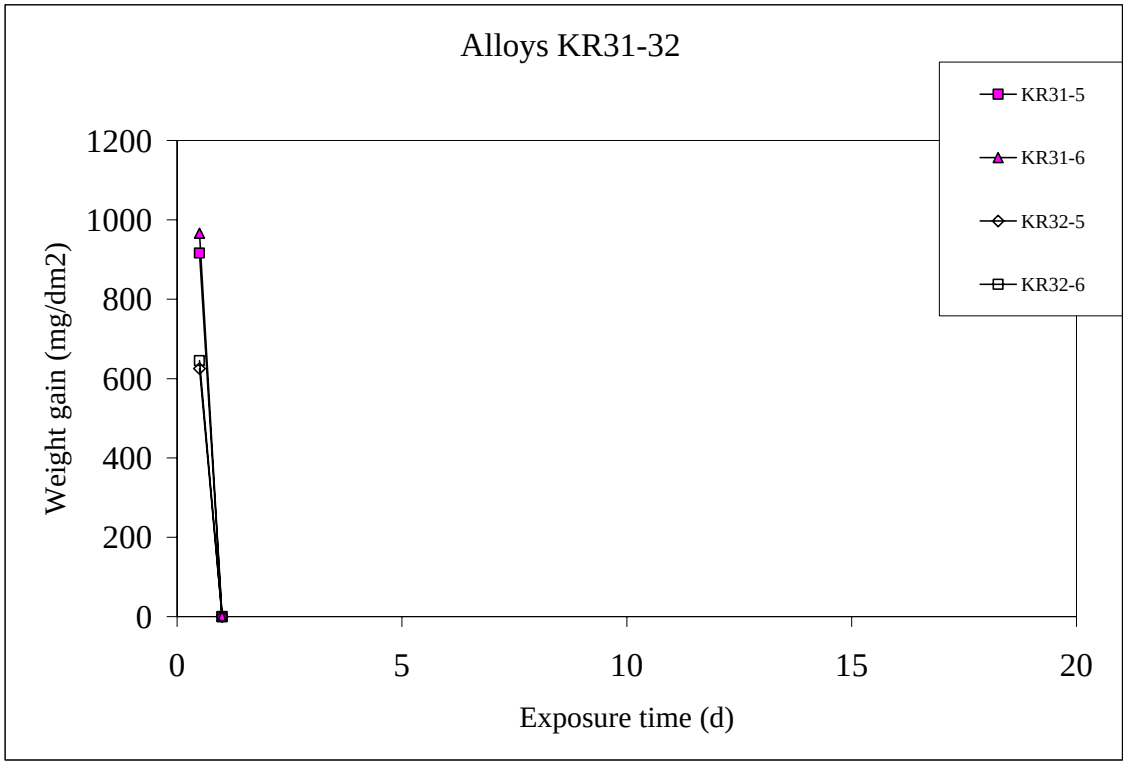


Alloy	Sample days	Gain(1) 0.5	Gain(2) 1.0	Gain(3) 4.0	Gain(4) 5.0	Gain(5) 6.0	Gain(6) 9.0	Gain(7) 14.0	
Zr-0.2Nb	KR21-5	1754.6							mg/dm2
Zr-0.2Nb	KR21-6	1575.7							mg/dm2
Zr-0.4Nb	KR22-5	31.9	29.2	34.2					mg/dm2
Zr-0.4Nb	KK22-6	25.5	32.7	57.7	62.6	69.0	84.0	96.2	mg/dm2

Alloy	Sample days	Gain(8) 19.0	Gain(9) 24.0	Gain(10) 29.0	Gain(11) 34.0	Gain(12) 39.0	Gain(13) 44.0	
Zr-0.2Nb	KR21-5							mg/dm2
Zr-0.2Nb	KR21-6							mg/dm2
Zr-0.4Nb	KR22-5							mg/dm2
Zr-0.4Nb	KK22-6	115.2	154.1	187.3	222.0	264.3	302.6	mg/dm2

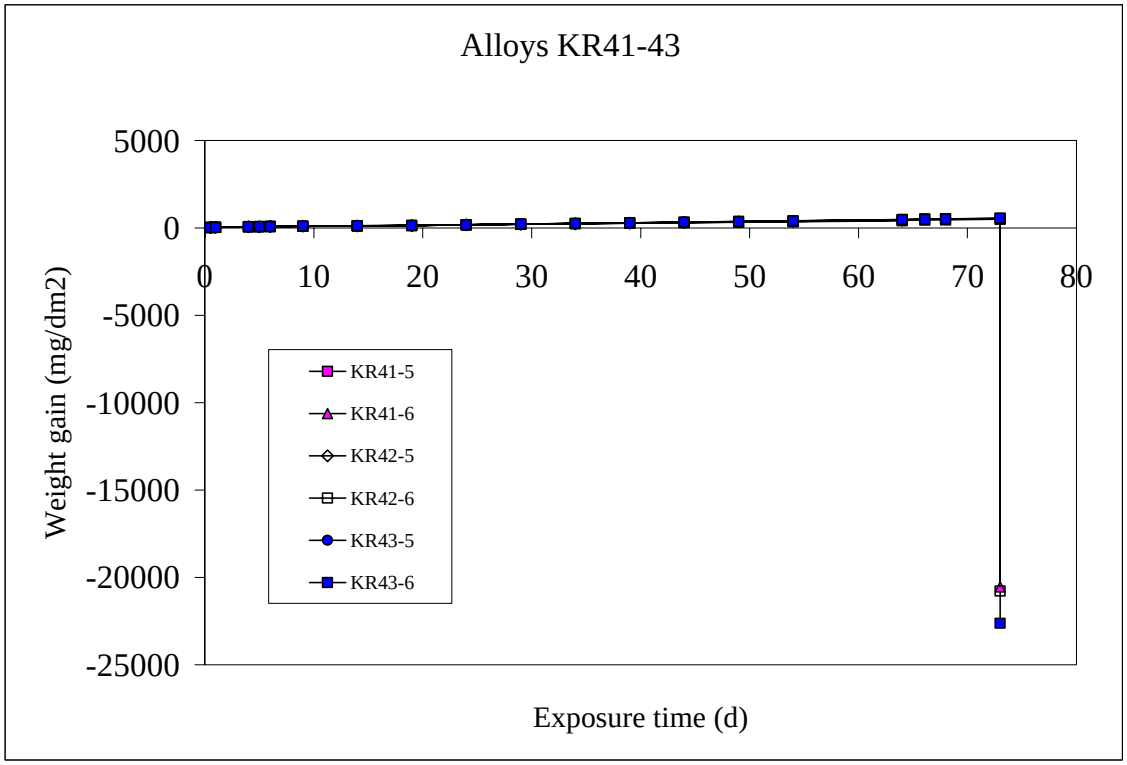
Alloy	Sample days	Gain(14) 49.0	Gain(15) 54.0	Gain(17) 64.0	Gain(18) 66.1	Gain(19) 68.0	Gain(20) 73.0	
Zr-0.2Nb	KR21-5							mg/dm2
Zr-0.2Nb	KR21-6							mg/dm2
Zr-0.4Nb	KR22-5							mg/dm2
Zr-0.4Nb	KK22-6	344.1	381.5	465.9	485.0	496.2	528.4	mg/dm2

ZrSnNb Alloys (Steam, W)



Alloy	Sample days	Gain(1) 0.5	Gain(2) 1.0
Zr-0.4Sn-0.2Nb	KR31-5	916.4	mg/dm2
Zr-0.4Sn-0.2Nb	KR31-6	966.4	mg/dm2
Zr-0.4Sn-0.4Nb	KR32-5	625.2	mg/dm2
Zr-0.4Sn-0.4Nb	KR32-6	645.2	mg/dm2

ZrNb Alloys (>0.5 Nb) (Steam, W)



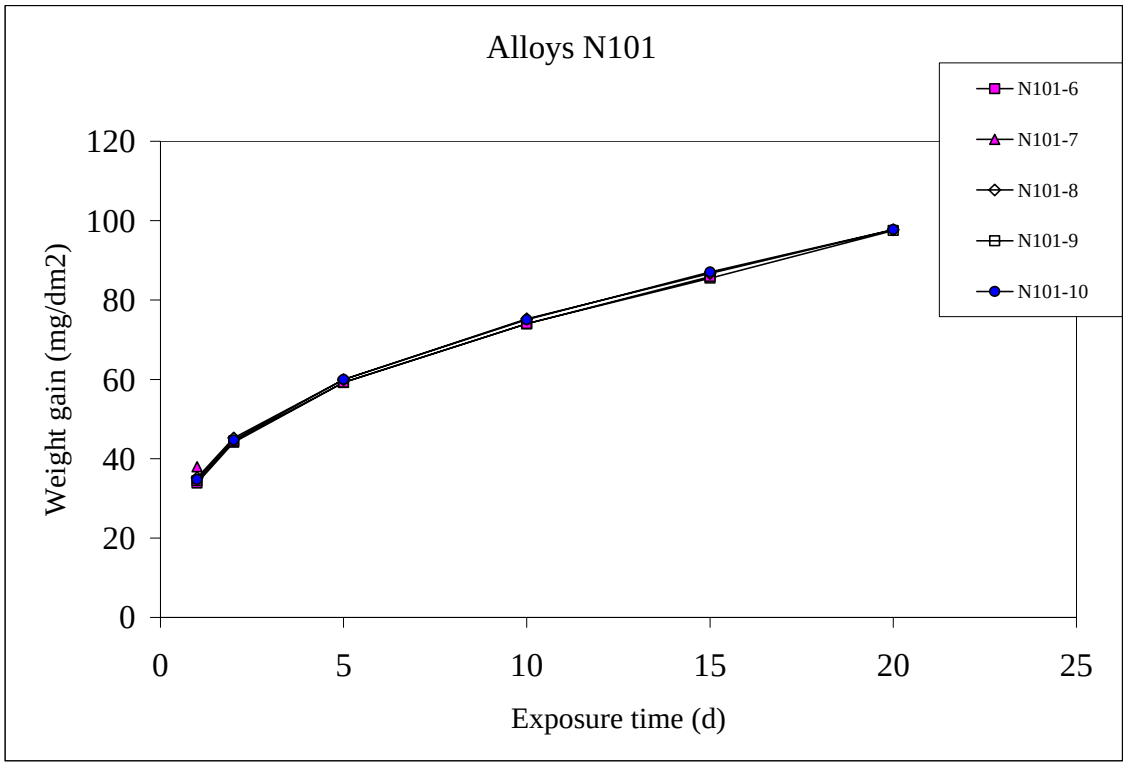
Alloy	Sample days	Gain(1) 0.5	Gain(2) 1.0	Gain(3) 4.0	Gain(4) 5.0	Gain(5) 6.0	Gain(6) 9.0	Gain(7) 14.0	
Zr-1.0Nb	KR41-5	23.5	33.6	68.2	75.4	83.6	105.2	123.5	mg/dm2
Zr-1.0Nb	KR41-6	22.2	32.1	67.7	74.7	82.7	102.8	122.4	mg/dm2
Zr-1.5Nb	KR42-5	23.2	31.8	60.5	67.3	75.3	94.6	114.1	mg/dm2
Zr-1.5Nb	KR42-6	22.7	31.0	61.6	68.2	75.8	93.3	112.1	mg/dm2
Zr-2.5Nb	KR43-5	22.8	32.3	64.3	70.9	78.6	97.4	116.2	mg/dm2
Zr-2.5Nb	KR43-6	22.8	31.9	64.9	71.5	79.3	97.3	116.0	mg/dm2

Alloy	Sample days	Gain(8) 19.0	Gain(9) 24.0	Gain(10) 29.0	Gain(11) 34.0	Gain(12) 39.0	Gain(13) 44.0	Gain(14) 49.0	
Zr-1.0Nb	KR41-5	145.1	179.9	208.9	233.4	264.8	295.2	325.3	mg/dm2
Zr-1.0Nb	KR41-6	144.9	181.9	216.7	245.0	278.8	312.6	345.5	mg/dm2
Zr-1.5Nb	KR42-5	135.9	175.4	203.4	234.4	270.0	304.8	338.8	mg/dm2
Zr-1.5Nb	KR42-6	134.7	179.6	213.1	247.2	287.5	322.9	363.9	mg/dm2
Zr-2.5Nb	KR43-5	137.9	174.1	215.1	253.7	289.2	325.2	361.7	mg/dm2
Zr-2.5Nb	KR43-6	137.6	175.3	218.0	256.8	291.6	331.2	370.3	mg/dm2

ZrNb Alloys (>0.5 Nb) (conti.)

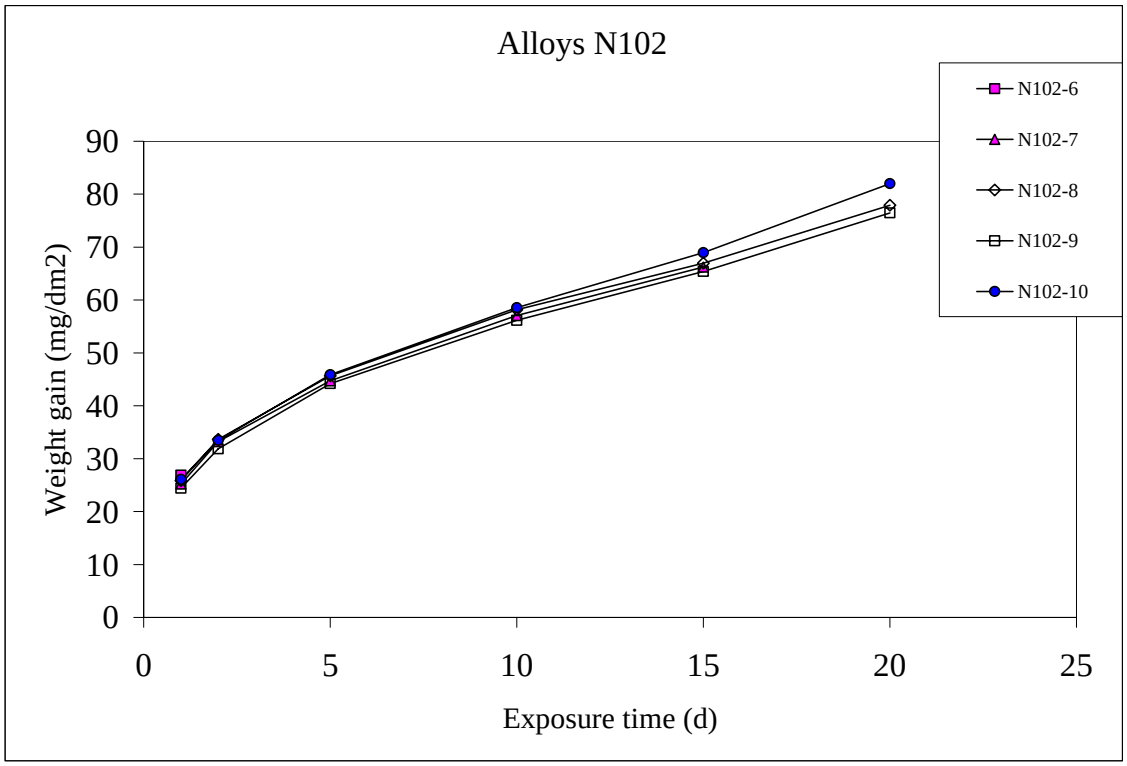
Alloy	Sample days	Gain(14) 49.0	Gain(15) 54.0	Gain(17) 64.0	Gain(18) 66.1	Gain(19) 68.0	Gain(20) 73.0	
Zr-1.0Nb	KR41-5	325.3	352.8	409.7				mg/dm2
Zr-1.0Nb	KR41-6	345.5	377.2	441.9	456.0	466.3	495.3	mg/dm2
Zr-1.5Nb	KR42-5	338.8	373.1	442.1				mg/dm2
Zr-1.5Nb	KR42-6	363.9	398.7	475.3	497.2	508.9	538.1	mg/dm2
Zr-2.5Nb	KR43-5	361.7	398.0	477.0				mg/dm2
Zr-2.5Nb	KR43-6	370.3	409.3	490.1	507.9	518.6	552.2	mg/dm2

Zr-1.0Fe Alloy (Steam, W)



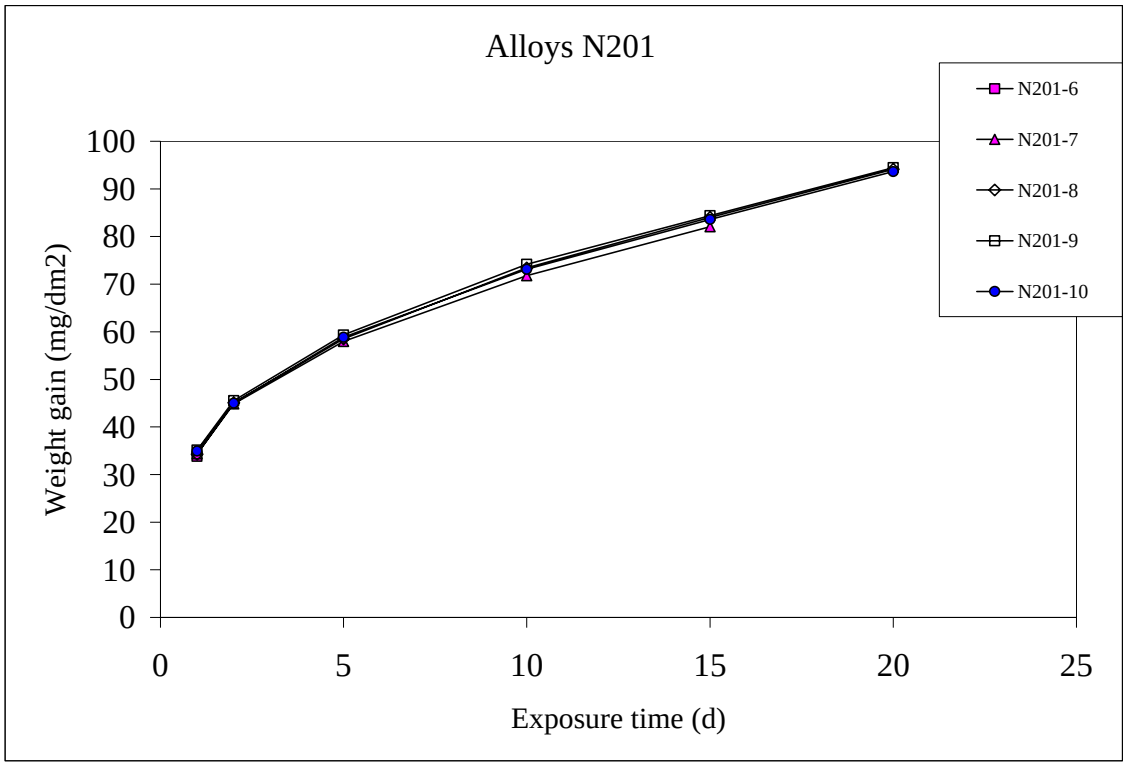
Alloy	Sample days	Gain(1) 1.0	Gain(2) 2.0	Gain(3) 5.0	Gain(4) 10.0	Gain(5) 15.0	Gain(6) 20.0	
Zr-1.0Fe	N101-6	33.8	44.1	59.2	74.0	85.9		mg/dm2
Zr-1.0Fe	N101-7	38.0						mg/dm2
Zr-1.0Fe	N101-8	35.2	45.2	59.9	75.2	86.7	97.7	mg/dm2
Zr-1.0Fe	N101-9	34.5	44.4	59.2	74.0	85.5	97.5	mg/dm2
Zr-1.0Fe	N101-10	34.8	44.7	60.0	75.0	87.1	97.8	mg/dm2

Zr-1.0Fe-0.5Cr Alloy (Steam, W)



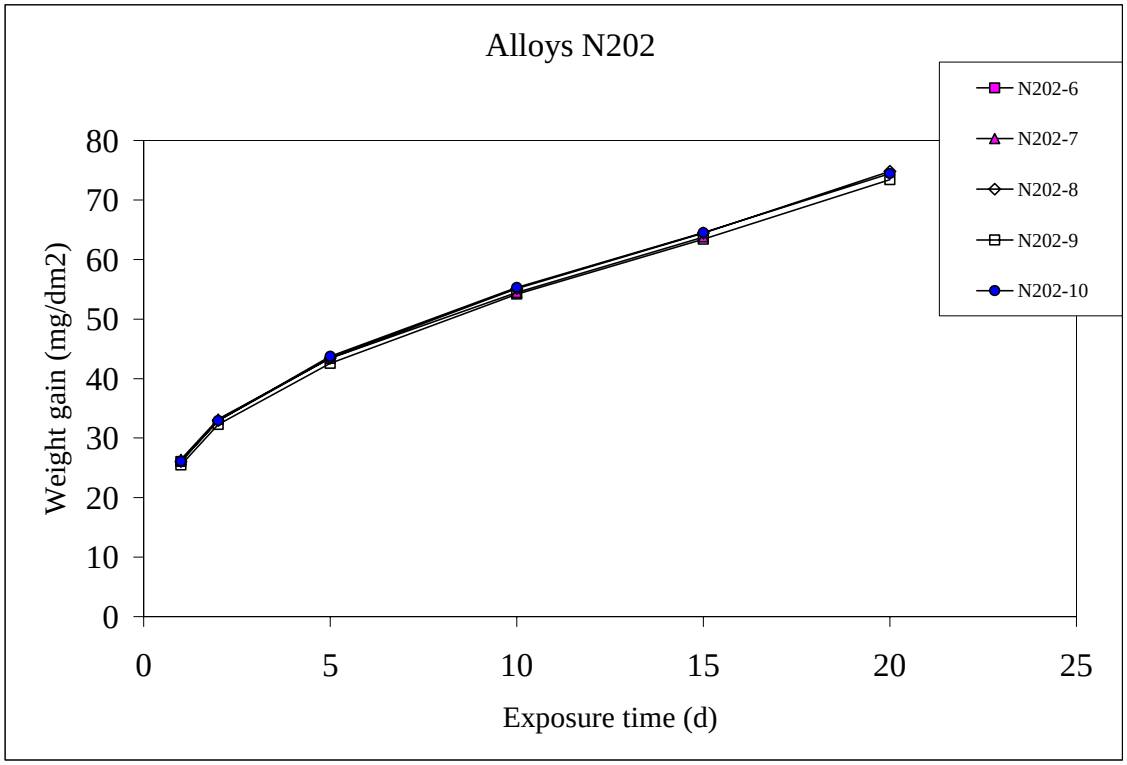
Alloy	Sample days	Gain(1) 1.0	Gain(2) 2.0	Gain(3) 5.0	Gain(4) 10.0	Gain(5) 15.0	Gain(6) 20.0	
Zr-1.0Fe-0.5Cr	N102-6	26.9						mg/dm2
Zr-1.0Fe-0.5Cr	N102-7	25.2	33.2	44.7	57.1	66.2		mg/dm2
Zr-1.0Fe-0.5Cr	N102-8	25.8	33.7	45.6	58.1	67.0	77.9	mg/dm2
Zr-1.0Fe-0.5Cr	N102-9	24.4	31.9	44.2	56.1	65.4	76.4	mg/dm2
Zr-1.0Fe-0.5Cr	N102-10	26.1	33.5	45.9	58.6	69.0	82.0	mg/dm2

Zr-0.6Fe Alloy (Steam, W)



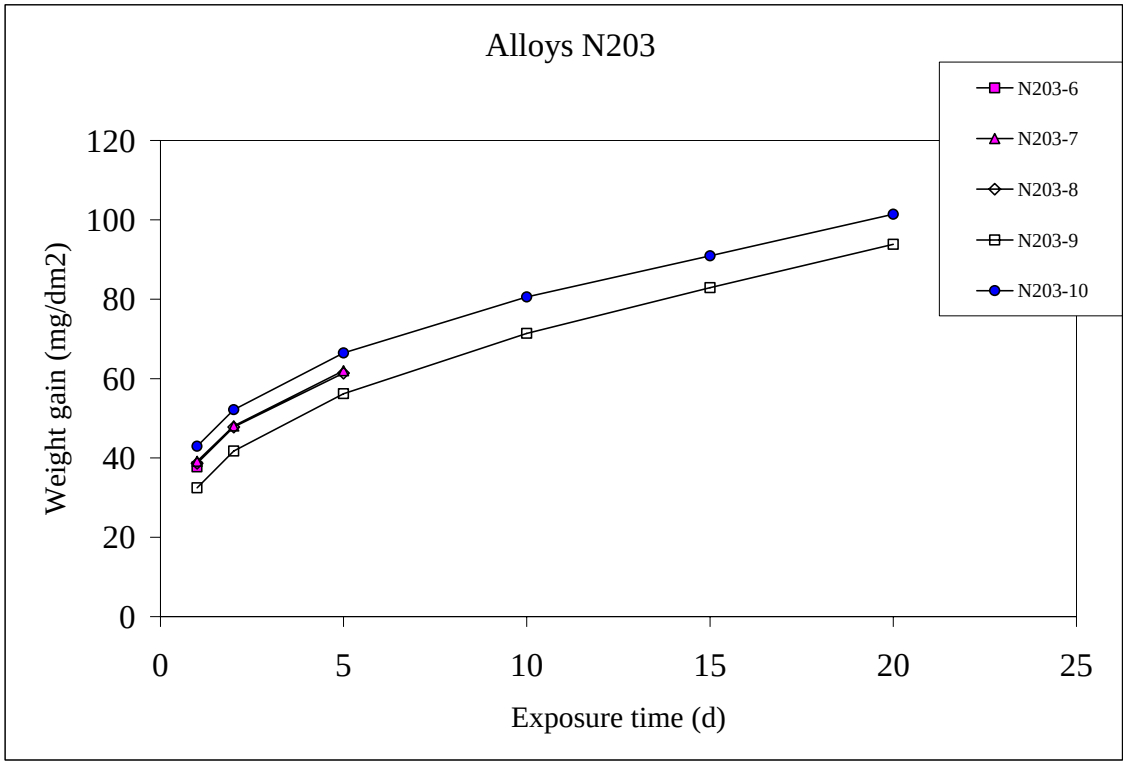
Alloy	Sample days	Gain(1) 1.0	Gain(2) 2.0	Gain(3) 5.0	Gain(4) 10.0	Gain(5) 15.0	Gain(6) 20.0	
Zr-0.6Fe	N201-6	33.8						mg/dm2
Zr-0.6Fe	N201-7	34.4	44.9	58.0	71.8	82.1		mg/dm2
Zr-0.6Fe	N201-8	34.3	45.1	58.5	73.4	84.0	94.2	mg/dm2
Zr-0.6Fe	N201-9	35.2	45.5	59.3	74.2	84.4	94.5	mg/dm2
Zr-0.6Fe	N201-10	35.0	45.0	58.8	73.1	83.6	93.6	mg/dm2

Zr-0.6Fe-0.3Cr Alloy (Steam, W)



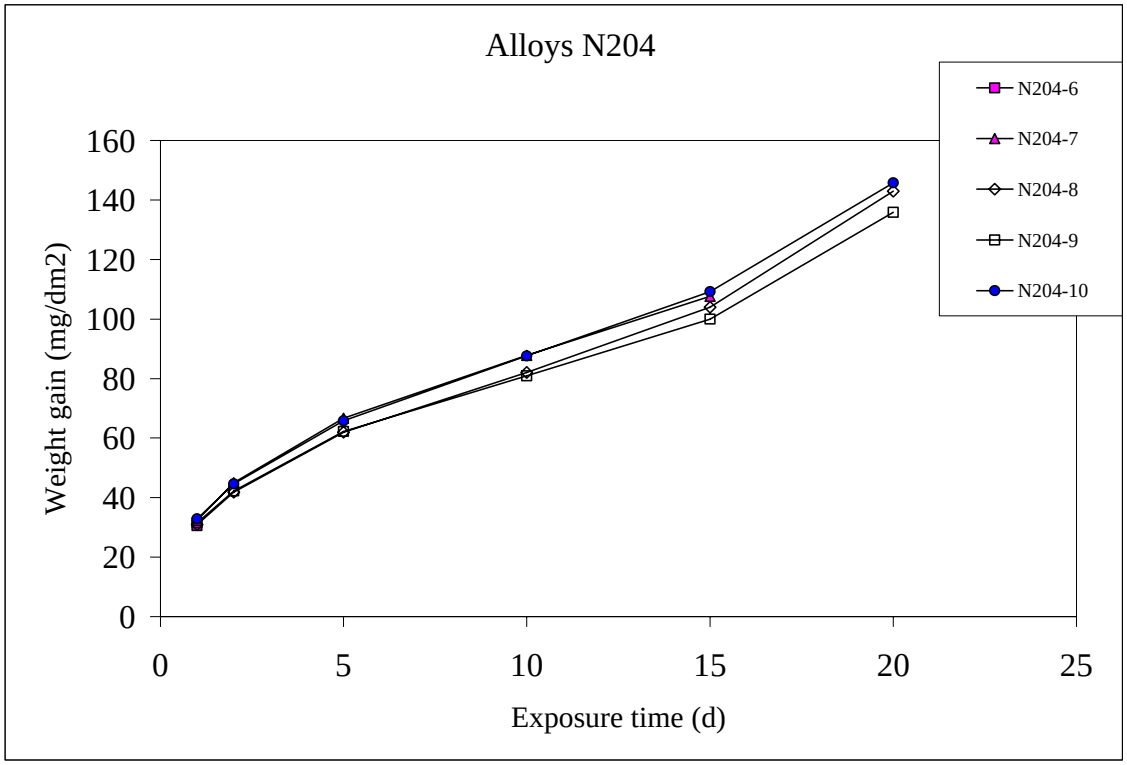
Alloy	Sample days	Gain(1) 1.0	Gain(2) 2.0	Gain(3) 5.0	Gain(4) 10.0	Gain(5) 15.0	Gain(6) 20.0	
Zr-0.6Fe-0.3Cr	N202-6	26.1						mg/dm2
Zr-0.6Fe-0.3Cr	N202-7	26.4	33.2	43.4	54.5	63.8		mg/dm2
Zr-0.6Fe-0.3Cr	N202-8	26.1	32.9	43.4	55.1	64.4	74.8	mg/dm2
Zr-0.6Fe-0.3Cr	N202-9	25.4	32.3	42.5	54.2	63.4	73.4	mg/dm2
Zr-0.6Fe-0.3Cr	N202-10	26.1	32.9	43.7	55.3	64.5	74.4	mg/dm2

Zr-0.6Fe-0.3Mo Alloy (Steam, W)



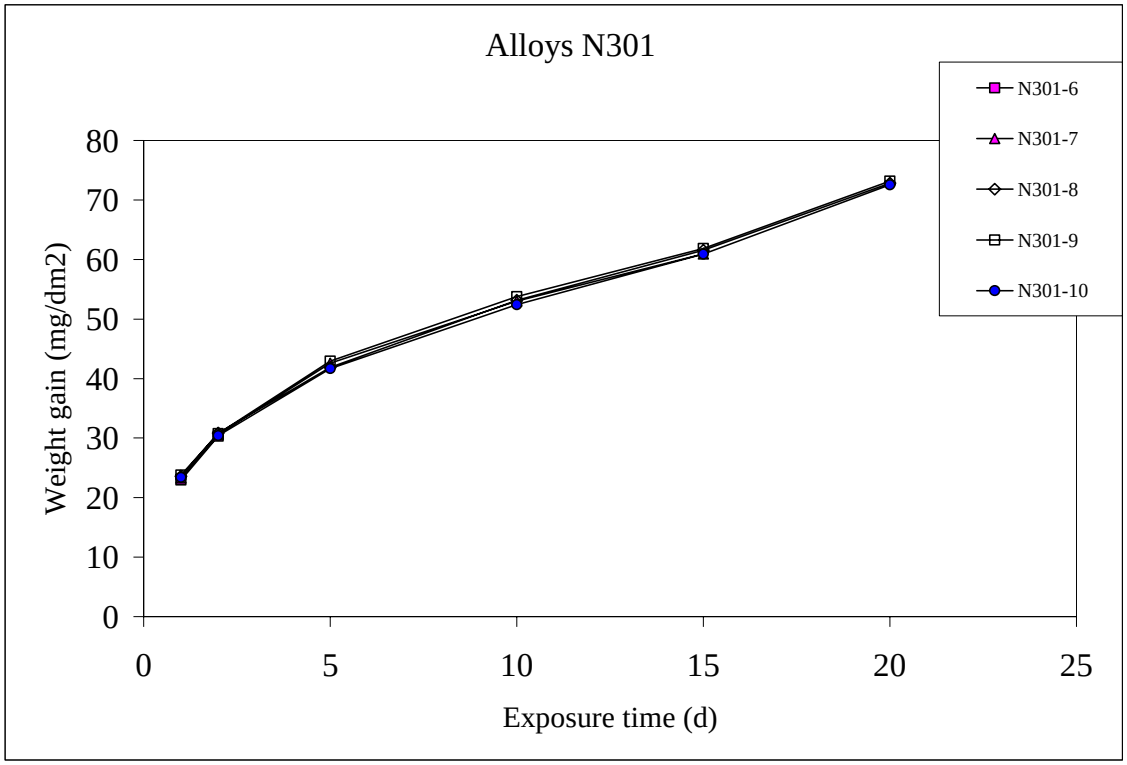
Alloy	Sample days	Gain(1) 1.0	Gain(2) 2.0	Gain(3) 5.0	Gain(4) 10.0	Gain(5) 15.0	Gain(6) 20.0	
Zr-0.6Fe-0.3Mo	N203-6	37.7						mg/dm2
Zr-0.6Fe-0.3Mo	N203-7	39.2	48.1	62.0				mg/dm2
Zr-0.6Fe-0.3Mo	N203-8	38.6	47.8	61.4				mg/dm2
Zr-0.6Fe-0.3Mo	N203-9	32.5	41.7	56.2	71.4	82.9	93.8	mg/dm2
Zr-0.6Fe-0.3Mo	N203-10	42.9	52.2	66.4	80.6	90.9	101.4	mg/dm2

Zr-0.6Fe-0.6Nb Alloy (Steam, W)



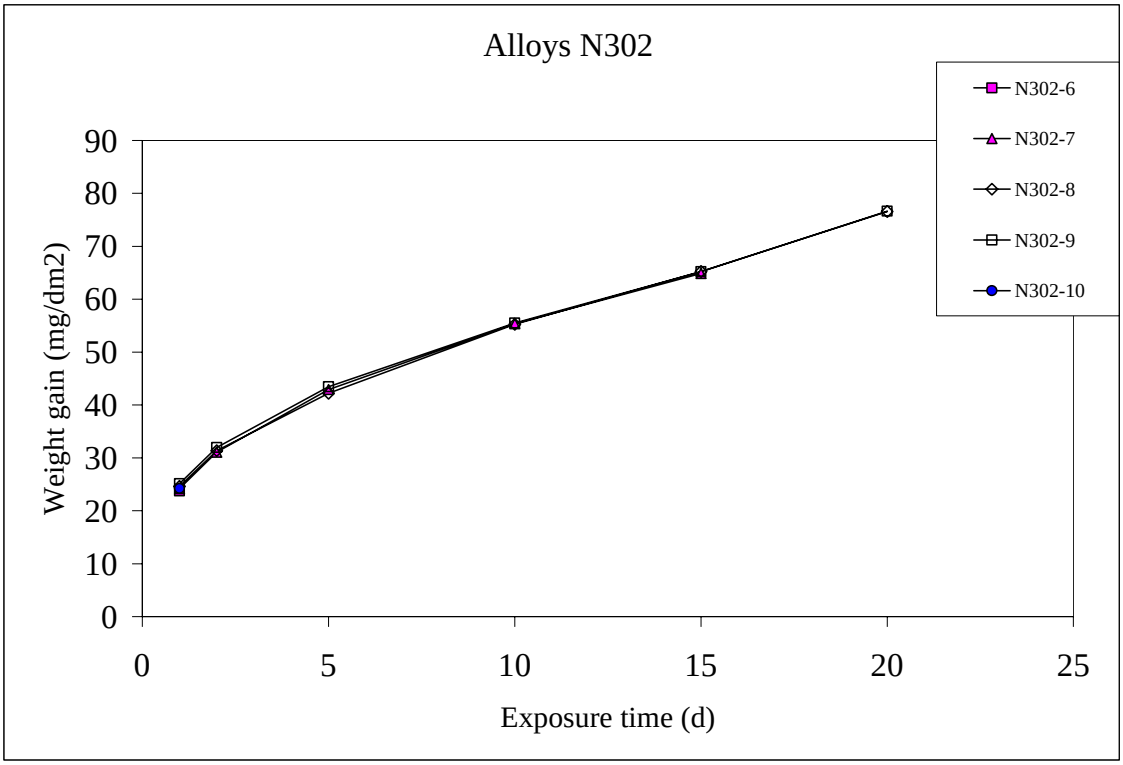
Alloy	Sample days	Gain(1) 1.0	Gain(2) 2.0	Gain(3) 5.0	Gain(4) 10.0	Gain(5) 15.0	Gain(6) 20.0	
Zr-0.6Fe-0.6Nb	N204-6	30.6						mg/dm2
Zr-0.6Fe-0.6Nb	N204-7	32.4	45.0	66.7	87.8	107.6		mg/dm2
Zr-0.6Fe-0.6Nb	N204-8	30.9	41.8	62.0	82.0	103.9	143.0	mg/dm2
Zr-0.6Fe-0.6Nb	N204-9	31.5	42.2	62.2	80.9	100.0	135.9	mg/dm2
Zr-0.6Fe-0.6Nb	N204-10	32.8	44.6	65.8	87.6	109.2	145.8	mg/dm2

Zr-1.0Cr-0.5Fe Alloy (Steam, W)



Alloy	Sample days	Gain(1) 1.0	Gain(2) 2.0	Gain(3) 5.0	Gain(4) 10.0	Gain(5) 15.0	Gain(6) 20.0	
Zr-1.0Cr-0.5Fe	N301-6	22.9	30.3					mg/dm2
Zr-1.0Cr-0.5Fe	N301-7	23.3	30.6	42.6	53.0	60.9		mg/dm2
Zr-1.0Cr-0.5Fe	N301-8	23.6	30.8	41.9	53.1	61.5	72.8	mg/dm2
Zr-1.0Cr-0.5Fe	N301-9	23.8	30.7	42.9	53.8	61.8	73.2	mg/dm2
Zr-1.0Cr-0.5Fe	N301-10	23.4	30.4	41.7	52.4	60.9	72.6	mg/dm2

Zr-1.0Cr-0.5Mo Alloy (Steam, W)



	Sample	Gain(1)	Gain(2)	Gain(3)	Gain(4)	Gain(5)	Gain(6)	
	days	1.0	2.0	5.0	10.0	15.0	20.0	
Zr-1.0Cr-0.5Mo	N302-6	23.7						mg/dm2
Zr-1.0Cr-0.5Mo	N302-7	24.2	31.1	42.9	55.4	64.9		mg/dm2
Zr-1.0Cr-0.5Mo	N302-8	24.6	31.4	42.2	55.3	65.2	76.6	mg/dm2
Zr-1.0Cr-0.5Mo	N302-9	25.1	32.0	43.4	55.5	65.2	76.7	mg/dm2
Zr-1.0Cr-0.5Mo	N302-10	24.2						mg/dm2