

**LAB ANALYSIS REPORT**

<b>Company:</b>	<b>Date:</b> March 8, 2012
<b>Submitted by:</b> [Redacted]	<b>Report No.:</b> 12-0119
<b>Ph.</b>	<b>P. O. No.:</b> <b>Page 1 of 10</b>

**IDENTIFICATION**

**Vendor:** Micron Technologies / Reballer - Corfin  
**Part Number:** Original 00085948F / Reballer 049999D-00  
**Description:** VFBGA90 - DDR 32Mx16  
**Quantity Received:** 3  
**Request No.:** MILA 851

**BACKGROUND INFORMATION**

Three devices have been re-balled. Analyze them using the generic flow. Perform detailed external analysis for defects or contamination; Sonoscan analysis for delamination or other defects. Perform electrical test at R/T and XRF to verify ball composition. Perform ball shear testing and SEM of sheared pads to characterize the separation(s).

**SUMMARY OF ANALYSIS PROCESS** (Numbered in Order Completed)

<u>4</u> Electrical Test 25°C	<u>2</u> Detailed Internal/External Analysis
<u>      </u> Curve Tracer	<u>5</u> Scanning Electron Microscope (SEM)
<u>      </u> Bake and Retest 2 Hours at 180°C	<u>      </u> Energy Dispersive X-Ray (EDX) Analysis
<u>6</u> XRF	<u>3</u> Ball Shear
<u>      </u> Decapsulate <u>      </u> Mechanical <u>      </u> Chemical	<u>1</u> Sonoscan

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## ANALYSIS

External optical inspection of the re-balled devices finds that the balls are mostly smooth with no evidence of contamination. No evidence of package damage, delamination or excessive residues was found. Ball diameter determined optically = 0.48mm.

Curve tracer analysis finds no opens or shorts and the junction characteristics are normal. Sonoscan testing found no evidence of delamination on any of the parts. See Figures 1 – 6.

Ball shear was performed on ten (10) balls /package with the following results:

Sample	Min.kg	Max. kg	Ave. kg
1	0.58	0.82	0.65
2	0.53	0.75	0.61
3	0.50	0.69	0.58

SEM images were collected of a typical ball from each sample. See Figures 7 – 9.

SEM inspection of the sheared device pads finds that all the samples appear to be ductile separations. See Figures 10 – 21.

XRF analysis finds that the re-balled ball contains lead (Pb). See Figure 22.

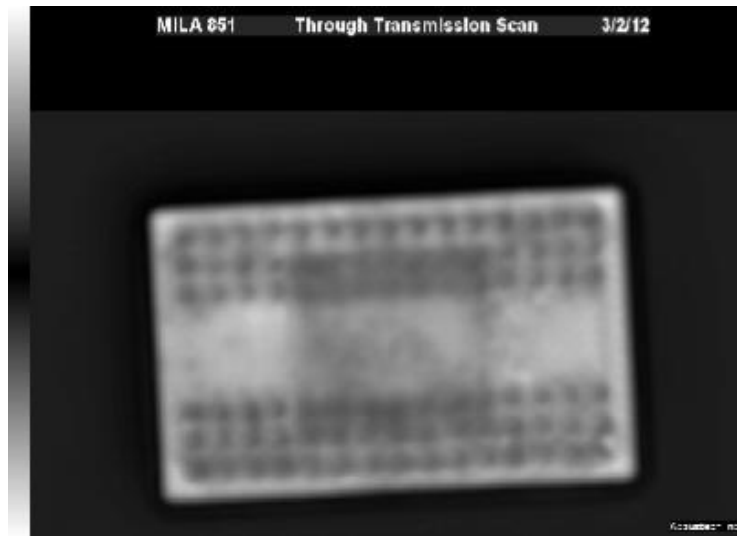
## CONCLUSION/COMMENTS

Sonoscan testing found no issues. Curve tracer analysis found no issues. The ball shear testing found the re-balled samples to be reasonably consistent. SEM analysis indicated that all shear separations were ductile. XRF analysis confirms that the re-balled balls contain lead.

**Figure 1**

**Sonoscan**

**Re-balled 1 – TS Scan**



**Figure 2**

**Sonoscan**

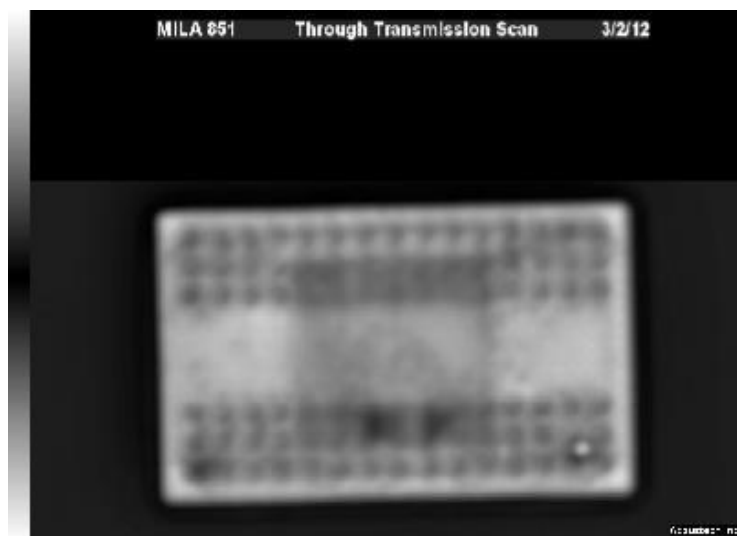
**Re-balled 1 Substrate**



**Figure 3**

**Sonoscan**

**Re-balled 2 – TS Scan**



**Figure 4**

**Sonoscan**

**Re-balled 2 – Substrate**



**Figure 5**

**Sonoscan**

**Re-balled 3 TS Scan**



**Figure 6**

**Sonoscan**

**Re-balled 3 – Substrate**

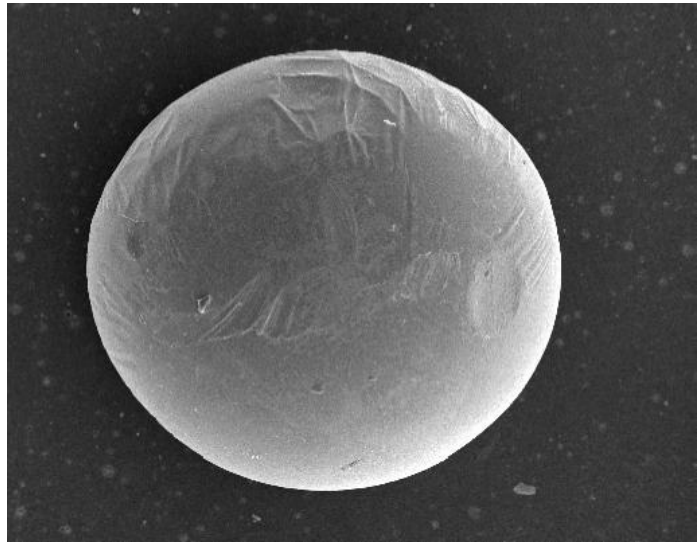


**Figure 7**

**Re-balled - 1**

**Ball**

**150X**

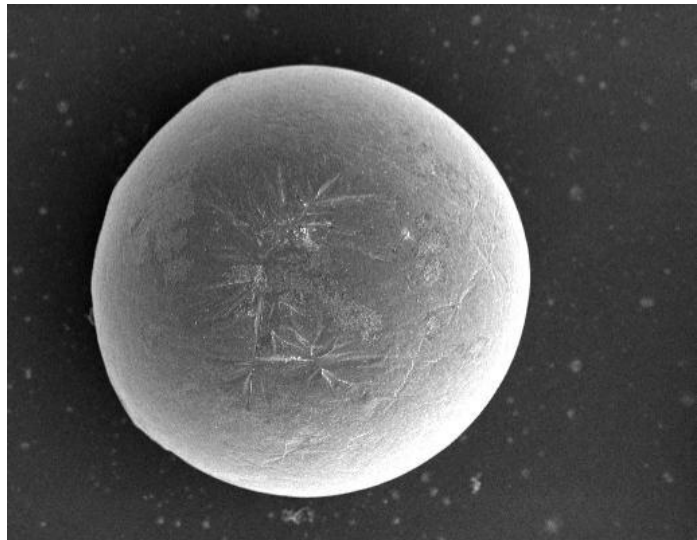


**Figure 8**

**Re-balled - 2**

**Ball**

**150X**

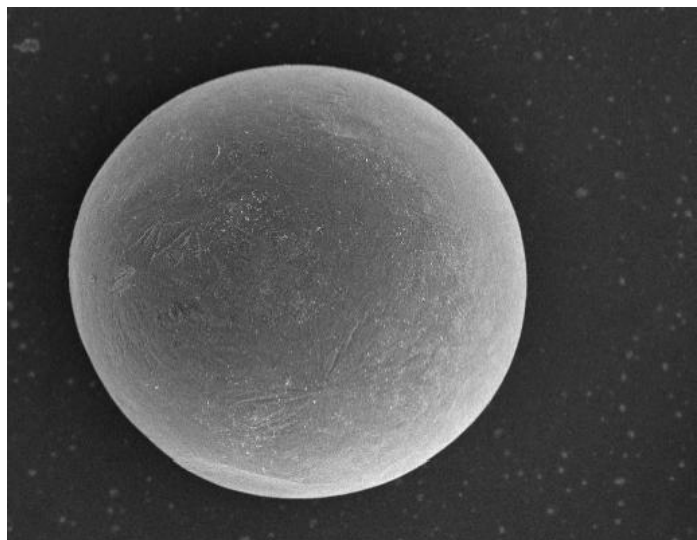


**Figure 9**

**Re-balled - 3**

**Ball**

**150X**

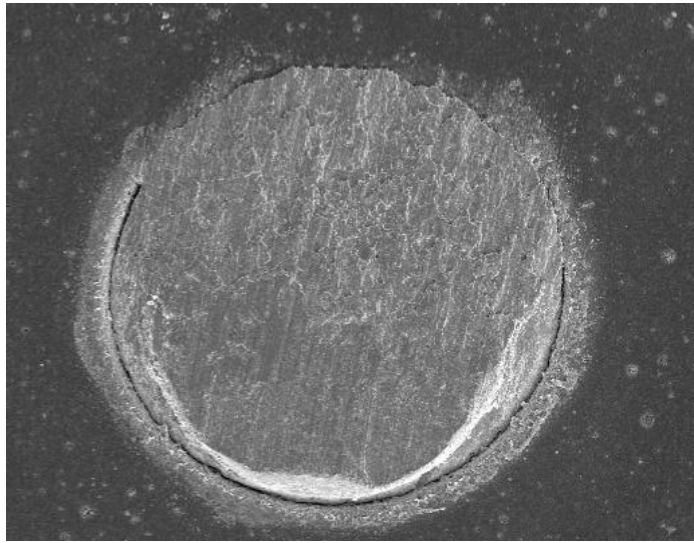


**Figure 10**

**Re-balled - 1**

**Typical Sheared Pad**

**180X**

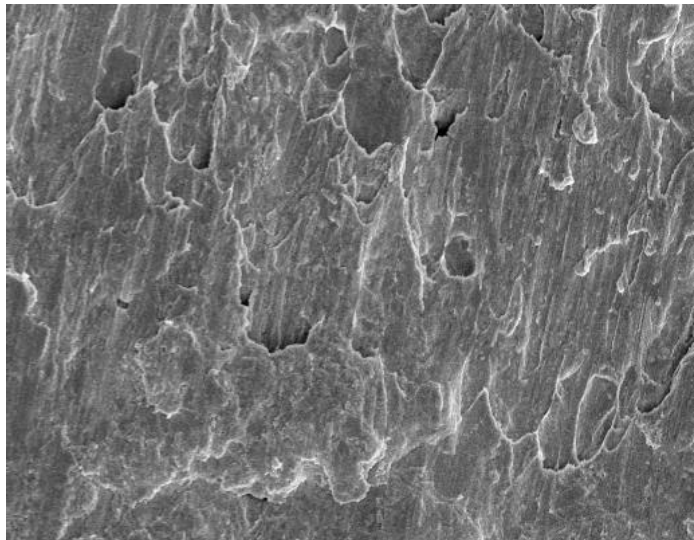


**Figure 11**

**Re-balled - 1**

**Typical Sheared Pad**

**1KX**

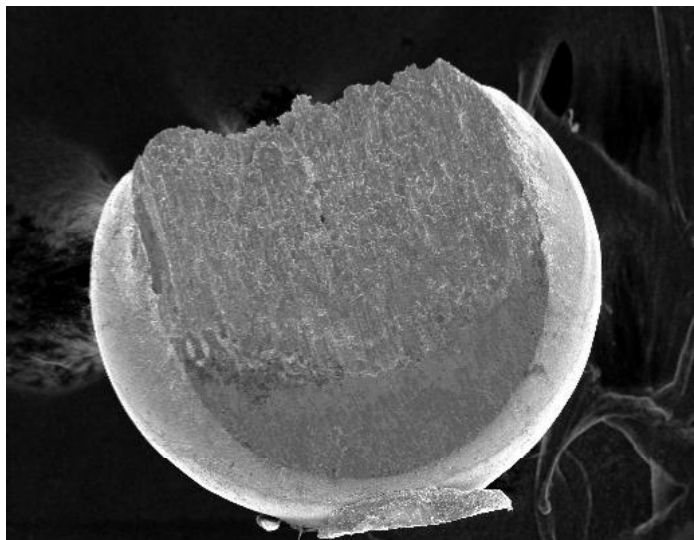


**Figure 12**

**Re-balled - 1**

**Typical Sheared Ball**

**160X**

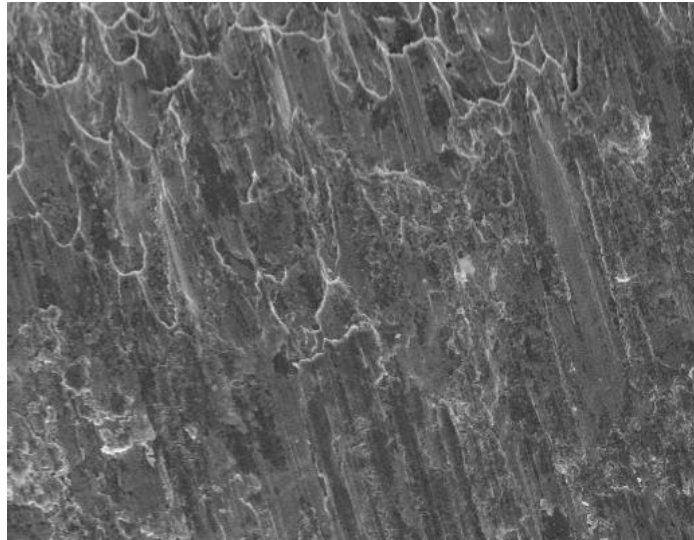


**Figure 13**

**Re-balled - 1**

**Typical Sheared Ball**

**1KX**

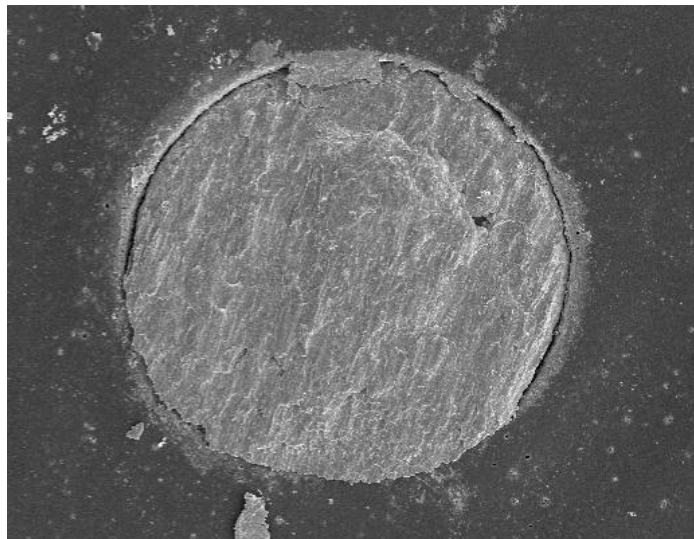


**Figure 14**

**Re-balled - 2**

**Typical Sheared Pad**

**180X**

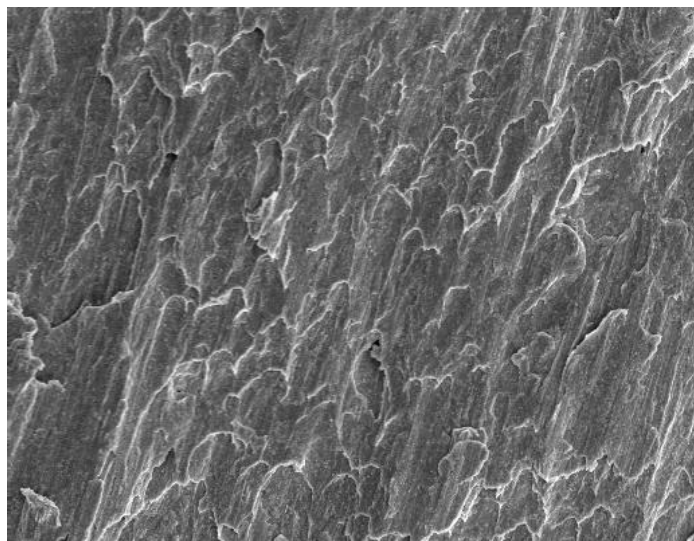


**Figure 15**

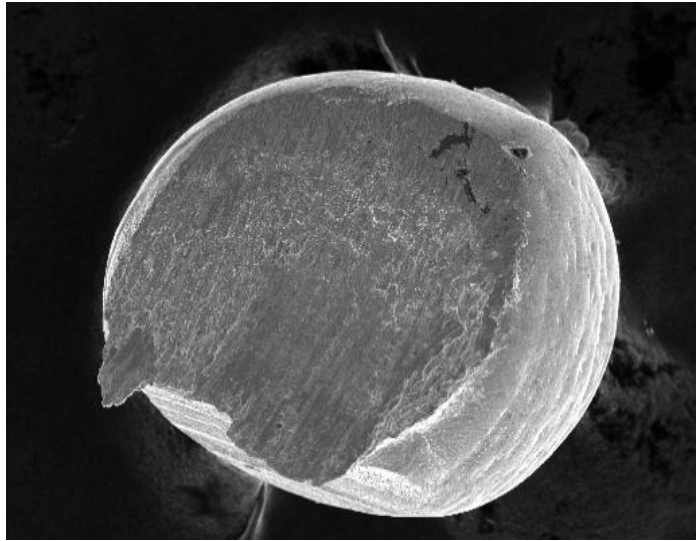
**Re-balled - 2**

**Typical Sheared Pad**

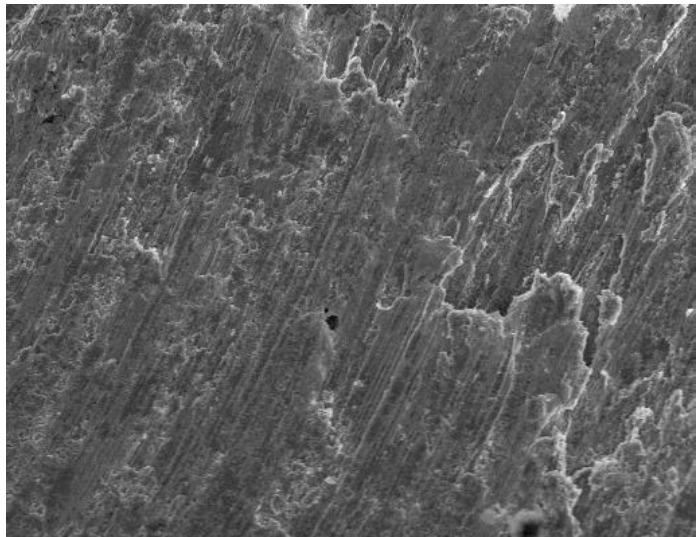
**1KX**



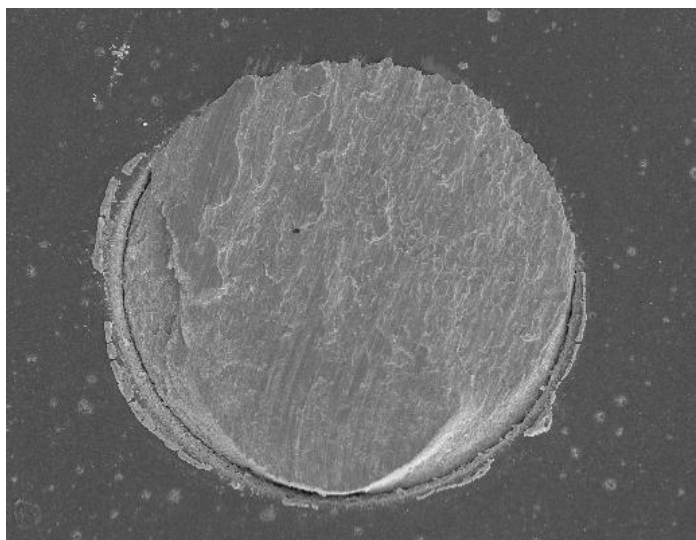
**Figure 16**  
**Re-balled - 2**  
**Typical Sheared Ball**  
**160X**



**Figure 17**  
**Re-balled - 2**  
**Typical Sheared Ball**  
**1KX**



**Figure 18**  
**Re-balled - 3**  
**Typical Sheared Pad**  
**180X**



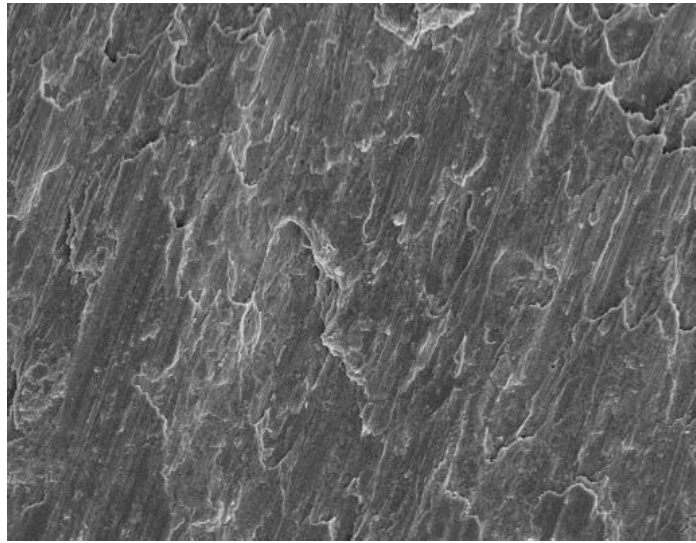


**Figure 19**

**Re-balled - 3**

**Typical Sheared Pad**

**1KX**

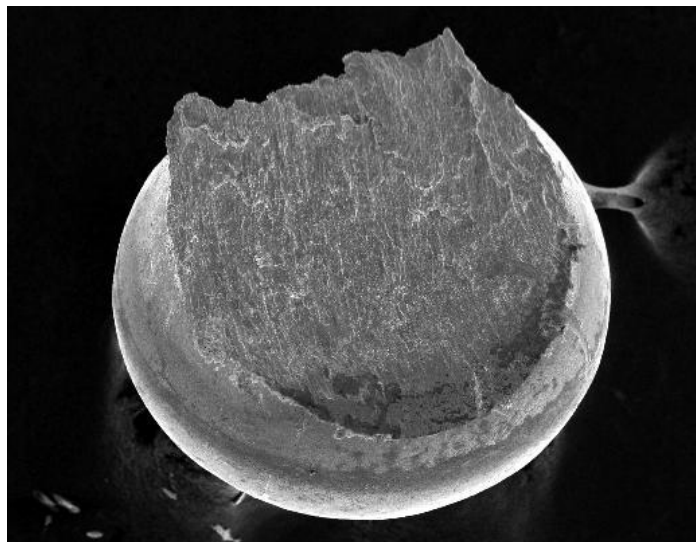


**Figure 20**

**Re-balled - 3**

**Typical Sheared Ball**

**150X**



**Figure 21**

**Re-balled - 3**

**Typical Sheared Ball**

**1KX**

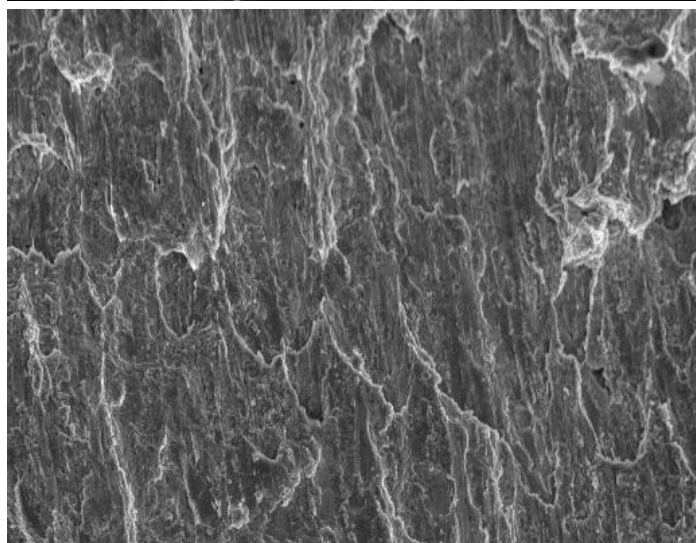


Figure 22

Re-balled

XRF

