

Dusting Off The Numbers of In Situ Particle Analysis: A Twenty-Five Year Experience

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Abstract

Introduction: The role of in-situ particle analysis in assigning the cause to parenchymal lung disease may be requested when patients have a reported occupational or environmental exposure to dust or other pathogenic material. There can be significant histologic overlap, however, in cases of pneumoconiosis and non-dust related lung disease.

Materials and Methods: All cases of in-situ particle analysis performed by the senior author (VLR) were searched. Cases in which fiber analysis was performed and cases where in situ analysis on non-lung tissue sites was performed were excluded. The remaining cases were separated into pneumoconioses and non-pneumoconiosis-based on the final diagnosis rendered.

Results: In-situ particle analysis was performed on 119 cases. Fiber analysis was performed on 13 cases. Non-lung tissue specimens accounted for 10 cases. In total 96 cases of in-situ analysis on lung or mediastinal lymph node tissue was performed. 56 (58%) were true pneumoconiosis cases. 40 (42%) were non-pneumoconiosis cases (Table 1).

Table 1

True Pneumoconiosis (n=56)		Non-pneumoconiosis (n=40)	
Mixed Dust Pneumo.	14	Nodular sarcoidosis/sarcoidosis	13
Hard Metal Lung Disease	7	Hypersensitivity pneumonia	10
Silicosis	7	Non-necrotizing granulomatous inflammation	3
Miscellaneous	6	Diffuse alveolar damage	2
Conglomerate Silicosis	2	Diffuse pulmonary fibrosis	2
Microcrystalline Cellulose	2	Idiopathic pulmonary fibrosis/Usual interstitial pneumonia (IPF/UIP)	2
I.V. Talcosis	2	Non-specific interstitial fibrosis (NSIP)	2
Berylliosis	2	Interstitial fibrosis, NOS	2
Pulmonary Alveolar Proteinosis	2	Diffuse pulmonary fibrosis with DIP-like areas	1
Rare Earth Pneumo.	2	Rounded atelectasis	1
Aluminum Arc Welders Pneumo.	2	Endogenous pneumoconiosis	1
Kaolin Workers Lung	1	Miscellaneous	1
Metallopneumoconiosis	1		
Dental Technicians Pneumo.	1		
Progressive Massive Fibrosis	1		
Silicate pneumo.	1		
Silicotic nodules	1		
Talc pneumo.	1		
Aluminosis	1		
Total	56	Total	40

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Summary and Conclusions: Scanning electron microscopy equipped with a back-scattered electron detector and energy dispersive spectrometer provides valuable information in the evaluation of interstitial lung disease that may be related to the inhalation of inorganic particulates. We provide analytical results on 96 cases, including 56 cases of pneumoconiosis and 40 cases of other interstitial lung diseases. Some of the more common examples of pneumoconiosis included in this study are mixed dust pneumoconiosis (14), hard metal lung disease (7), and silicosis (7). Disorders to be distinguished from pneumoconiosis that were commonly analyzed include sarcoidosis (13) and hypersensitivity pneumonia (10). Details are provided regarding the findings in each of these disorders as well as less commonly encountered conditions.

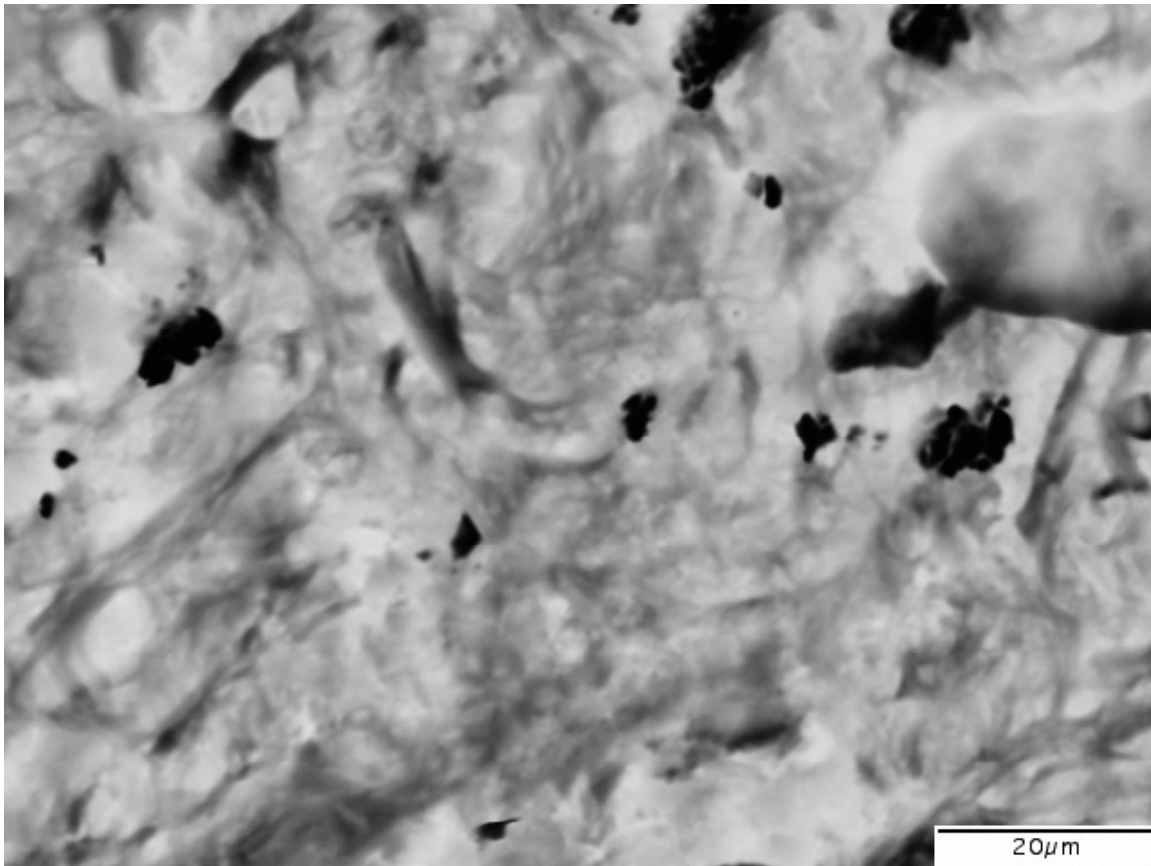


Figure 1. Detail of particles in fibrotic lung (BEI)

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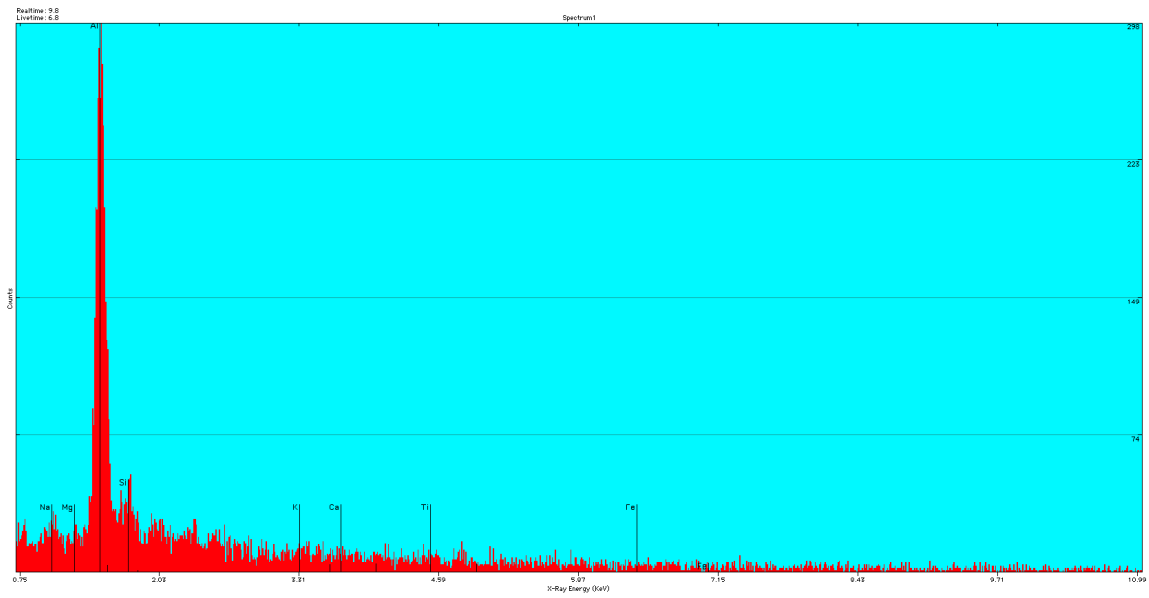


Figure 2. Aluminum spectrum