Adsorption behavior of trace trivalent europium and americium on kaolinite and montmorillonite in the presence of humic acid was investigated. In the system, humic acid was also adsorbed on kaolinite and montmorillonite. The kinetic study shows that Eu(III) and Am(III) form humate complex species if these ions are dissolved in the aqueous phase or adsorbed on the clay minerals. The pH dependences of the adsorption behavior of these trivalent ions and humic acid were almost identical at C_s=0.02 and 0.1 (C_s: concentration of supporting electrolyte), showing that humate is dominant species for Eu(III) and Am(III) at pH between 3 and 10. At C_s=0.7, humic acid was markedly adsorbed, where Eu(III) and Am(III) were also adsorbed on the solid phase more than at C_s=0.02 and 0.1. These results suggest that pseudo-colloid like clay minerals coated with humic substances were important as reservoir of metal ions like Eu(III) and Am(III) in the environment. Since it was shown that the adsorption behavior of humic acid is important for the behavior of Eu(III) and Am(III), the humic acid adsorption on the clay minerals was also studied in detail.

97-111 ELEMENTAL COMPOSITION OF HYPERTROPHIC SCAR AND NORMAL SKIN TISSUE USING PROTON INDUCED X-RAY EMISSION. R. Hollands, N.M. Spyrou. Physics Department, University of Surrey, Guildford, Surrey, GU2 6JA, UNITED KINGDOM

Hypertrophic scars are a particular type of scar that can form after any type of dermal trauma. They are unsightly, red, and elevated above normal skin level. At present no-one knows why these scars form. Full thickness hypertrophic skin tissue as well as full thickness normal skin samples, obtained form the Restoration of Appearance and Function Trust (RAFT), Institute of Plastic Surgery, Mount Vernon Hospital, were analysed, using both PIXE and RBS, with a 2MeV proton beam. The epidermis was compared to the dermis on both normal and scarred tissue, and each was compared to the other, to see if there were any variations in elemental composition. In all the samples P, S, Cl, K, Ca, Fe were detected. In the majority of samples Zn and Cd were found, and in a few samples Sn was determined. Significant differences in concentrations, for the elements P, K and Zn, between the epidermis and dermis in both hypertrophic scarred and normal skin tissue were found. A difference was also detected between elemental concentrations in normal and scarred skin for the elements Ca and Cl.

97-112 INITIAL GENERATION AND SEPARATION OF ^{99}Mo AT SANDIA NATIONAL LABORATORIES. Darren G. Talley*, Susan C. Bourcier, Marion J. McDonald, Susan W. Longley, and Edward J. Parma, Jr. Sandia National Laboratories, Isotope Production and Compliance Initiatives Department, Albuquerque, NM 87185-1141, USA.

The radioisotope ^{99m}Tc, used in greater than 80% of nuclear medicine applications, has traditionally been produced and supplied to radiopharmaceutical companies in the form of its precursor ^{99}Mo. Nuclear fission produced ^{99}Mo had been supplied by Nordion International of Canada and Cintichem, Inc. of New York, USA. With the shutdown of Cintichem's reactor in 1989, a need was recognized for a US supply, and the US Department of Energy recently published a record of decision designating Sandia National Laboratories (SNL) to meet that need. A recent campaign was launched which utilized the SNL Annular Core Research Reactor to irradiate UO_2 coated targets fabricated by Los Alamos National Laboratory to produce ^{99}Mo. The irradiated targets were chemically processed in the SNL Hot Cell Facility to separate and purify the ^{99}Mo. The campaign also included final product quality analysis, and process waste handling. The campaign was accomplished with high ^{99}Mo recovery. Final product quality was assessed at SNL, and samples were sent to an outside laboratory for independent verification. The campaign provided data and experience useful in pursuing US Food and Drug Administration and radiopharmaceutical company approval.

97-113 MULTIELEMENT DETERMINATION OF CATTLE HAIR INFESTED WITH Boophilus microplus BY INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS. M.J.A.Armelin.

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Nuclear methods, especially instrumental neutron activation analysis (INAA) are playing an important role in determining elemental concentrations in biological samples. Trace elements have a function in the physiopathological process of ecto and endoparasites infections. The alterations in the trace element concentrations are useful as indicators of the pathogenic effects caused by the parasites. Five Holstein-Friesan male calves aged six months were infested with 1g Boophilus microplus larvae (Acari: Ixodidae).Samples of cattle hair from nine animals (infected and control group) were collected. Multielement analysis of cattle hair were carried out by INAA. Gamma ray spectrometry was used for the identification and estimation of concentrations of elements. The INAA is particularly attractive because it involves a minimum of sample handling and is therefore less prone to errors. The concentrations of Co, Cr, K, Mo, Mn, Na, Se and V were at the ng/g level, while Ca, Cu, Mg and Zn were at the mg/g level. The variation in the elemental concentration for samples of different animals was answered satisfactorily by INAA.

97-114 A MULTIPLE APPROACH TO THE DETERMINATION OF RADON FLUXES FROM SEDIMENTS. D.R. Corbett, W.C. Burnett, P.H. Cable, S.B. Clark*. Environmental Radioactivity Measurement Facility, Department of Oceanography, Tallahassee, FL 32306, USA; *Department of Chemistry, Washington State University, Pullman, WA 99164, USA.

Exchange across the sediment-water interface may be important in determining the chemical composition of overlying waters. The chemically and biologically inert radioactive gas, ^{222}Rn, has been used as a tracer to measure rates of gas transport across this interface. In a recent study, radon was used to quantify groundwater flow into a former cooling pond at the Savannah River Site. Since all potential sources and sinks needed to be taken into account, diffusion of ^{222}Rn from bottom sediments into the overlying water was considered an important parameter. These fluxes were obtained by: (1) direct measurement in the laboratory using a simulated sediment bed and water column; (2) a "sediment equilibration" technique; and (3) porewater modeling. The first method, analogous to an in situ benthic chamber, uses direct observation of the increasing ^{222}Rn activity in water overlying a sediment bed packed in plastic columns. This allows direct measurement of the effective wet bulk sediment diffusion coefficient (Ds) which can then be used to calculate radon fluxes based on the equilibration technique, without any prior knowledge of the sediment characteristics. We also measured the ^{222}Rn deficiency in porewaters from the simulated sediment cores as a function of depth, which can be used to estimate diffusive fluxes.

97-115 DETERMINATION OF CORRECTION FACTORS IN THE MANGANESE BATH SYSTEM OF KRISS. Jong-Youl Kim*, Kil-Oung Choi, Kwang-Pill Lee,[1] Keung-Shik Park. [1]Chemistry and Radiation Division, Korea Research Institute of Standards and Science, P.O. Box 102, Yusung, Taejon-city, REPUBLIC OF KOREA, [1]Kyungpook National University, Taegu, 702-701, REPUBLIC OF KOREA

The neutron emission rates of an Am-Be9(Alpha,n)source and a Cf-252 spontaneous fission source were measured in a 1.26 m-diameter manganese sulphate bath of Korea Research Institute of Standards and Science(KRISS). The corrections for oxygen and sulphur capture of fast neutron, for neutron leakage from the bath, and for the thermalized neutron capture in the source were calculated for KRISS manganese sulphate bath by Monte Carlo and diffusion methods. The correction for the impurities contained in the manganese sulphate solution is also discussed.