Determination of an activity series lab answers

What does the activity series tell us. The activity series chemistry answer key. Activity series of metals lab answers. What is the activity series and how is the activity series useful in predicting chemical behavior.

The purpose of the lab was to find which metal is the most reactive and which metal is the least reactive. It was known before the experiment that the metals used in the experiment are placed in the activity series from most active to least active as follows: magnesium, aluminum, zinc, and copper. The hypotheses formed were that zinc nitrate would react with aluminium and magnesium; aluminium nitrate would react with magnesium; copper nitrate would react with zinc, magnesium, and aluminium; and magnesium nitrate would not react with any metals. Materials 0M zinc nitrate0M aluminum nitrate0M copper nitrate0M magnesium nitratePipettes(4)Copper wireAluminum wireMagnesium ribbonZinc metal stripsSandpaperMicroscale reaction plate Use a pipette to fill each of the four wells in column 1 of the reaction plate with 2mL of 1.0M aluminium nitrate solution.Repeat the procedure in step 1 to fill the four wells in column 2 with 2mL of 1.0M magnesium nitrate solution.Repeat the procedure in step 1 to fill the four wells in column 3 with 2mL of 1.0M zinc nitrate solution.Repeat the procedure in step 1 to fill the four wells in column 4 with 2mL of 1.0M copper nitrate solution.With sandpaper, polish 10cm of aluminium wire until it is shiny. Use scissors to cut the aluminium wire into four 2.5-cm pieces.Place a piece of the aluminium wire in each row; A well that contains the solution.Repeat the procedure from step 5 using 10cm of magnesium ribbon. Place the ribbon in each row well that contains the solution.Use sandpaper to polish small strips of zinc metal. Place a piece of zinc metal in each row C well that contains the solution.Repeat the procedure from step 5 using 10cm of copper wire. Place the pieces in each row D well that contains the solution.Observe what happens in each cell. After five minutes, record your observations on the data table you made. Al(NMg(NZn(NCu(NAlNRNRNRNRNRMgFew bubblesNRNRSolution color change from blue to green, metal oxidizedZnNRNRNRSolution color change from blue to green, bubbles, magnesium broke downCuNRNRNRNRNR In this lab, the researchers found that magnesium is the most active metal and copper and aluminum are the least active metals. The experiment was completed using aluminum nitrate, copper nitrate, zinc nitrate, and magnesium nitrate to see what happened when aluminum, copper, zinc, and magnesium were placed in each solution. READ: Single Displacement Reactions Lab ExplainedThe researchers predicted that zinc nitrate would react with magnesium and aluminium; aluminium nitrate would react with magnesium; copper nitrate would react with zinc, magnesium, and aluminium; and magnesium nitrate would react with none of the metals. This experiment confirmed the researcher’s hypotheses that a reaction would occur between copper nitrate and zinc, and copper nitrate and magnesium; between aluminium nitrate and magnesium; and that no reactions would take place between magnesium nitrate and any of the metals. This experiment contradicted the researcher’s hypotheses that a reaction would occur between zinc nitrate and magnesium, and zinc nitrate and aluminum; and that copper nitrate would react with aluminum. In a single replacement reaction, the lone metal is more active than the metal in the compound. The activity series is a list of metals in order from most active to least active from top to bottom; therefore, for a single replacement reaction to occur, the lone metal should be higher in the activity series than the metal in the compound for a reaction to take place. The group found that aluminum and copper were not reactive at all with any of the solutions. Zinc was somewhat reactive, reacting with one solution. Magnesium was the most reactive metal, reacting with two solutions. It is possible that while using the pipettes, the same exact amount of solution was not placed in each well as planned. It is also possible that a color change occurred upon the metals in the solutions that some researchers noticed that others did not. A real-life example of a single replacement reaction is the Statue of Liberty. The outside of the Statue of Liberty is made of copper, the inside made of steel; when the copper oxidized (forming the bluish-green color), a single replacement reaction occurred causing the iron to convert the copper back to copper metal. The iron in the steel rusted. A: CDC recommends collection of a buccal swab specimen as soon after parotitis onset as possible from all patients with clinical features compatible with mumps. See Specimen Collection, Storage, and Shipment for detailed instructions regarding recommended specimen for mumps testing. A: A buccal swab specimen for detection of virus should be collected as soon as possible upon suspicion of mumps disease. The early collection of buccal swab specimens provides the best means of laboratory confirmation, particularly among suspected mumps patients with a history of vaccination (Rota et al, 2013). If it has been 3 days since symptom onset, collect a buccal swab specimen for rRT- PCR and a serum specimen for IgM detection. If the patient has orchitis/oophoritis, mastitis, pancreatitis, hearing loss, meningitis, or encephalitis, collect a buccal swab specimen for rRT-PCR and a serum specimen for IgM detection, regardless of days since symptom onset. In an outbreak setting (see Figure below), the proportion of specimen with positive results by rRT-PCR (N target gene) decreased as the interval between onset and

specimen collection increased (Rota et al., 2013). The trend was reversed for IgM detection with increasing time to specimen collection the number of seropositive specimens increased. The percentage of positive results obtained from testing 296 confirmed mumps cases from New York City by day of sample collection after onset of symptoms. The serum specimen were tested for presence of IgM using the CDC capture IgM EIA. The buccal swab specimen were tested by rRT-PCR using the mumps nucleoprotein (N) gene as the target. *Done in collaboration with New York City Department of Health and Mental Hygiene Public Health Laboratory, New York, NY Mumps virus was isolated from 209 (71%) of the 296 buccal swabs tested. A: Viral detection methods include molecular assays, such as real time reverse transcription PCR (rRT-PCR) to detect mumps viral RNA. rRT-PCR is performed by almost all state and local public health laboratories, the APHL Vaccine Preventable Disease Reference Centers (VPD-RC [2 pages])pdf iconexternal icon, and CDC. Genotyping, based on the sequence of the gene coding for the small hydrophobic (SH) protein can also be performed by the VPD-RCs and CDC and this is the only test to discriminate vaccine reactions from wild-type infections. IgM can aid in diagnosis but is not confirmatory. The availability of assays to detect IgM to aid in the diagnosis of acute mumps infection and to measure IgG antibodies to document previous exposure to mumps vary among laboratories. The state health department can provide guidance regarding available laboratory services. At the direction of the state health department, healthcare providers and state and local health departments may send serum specimens from suspected mumps cases to CDC/VVPDB for IgM detection using a capture IgM enzyme immunoassay that incorporates a recombinant mumps nucleocapsid protein as the antigen. A: Since as early as 1919, reports have described persons that develop parotitis on one side that resolves but is followed days to weeks later by parotitis on the other side. These early reports indicate that recurrent parotitis was seen in the pre-vaccine era as well as in recent outbreaks. From the few paired buccal swab specimens the CDC laboratory has received, mumps RNA was detected during both early and late episodes of parotitis. Collection of both buccal swab and serum specimens from each episode of parotitis is recommended and patient isolation from date of onset of the most recent parotitis episode is recommended. Top of Page Detection of Mumps Virus in Clinical Specimen A: CDC recommends collection of a buccal swab specimen for rRT-PCR if it has been 3 days since symptom onset, collect a buccal swab specimen for rRT-PCR and a serum specimen for IgM detection. This may be particularly important in the beginning of an outbreak when it is unclear if mumps is the cause. If the patient has orchitis/oophoritis, mastitis, pancreatitis, hearing loss, meningitis, or encephalitis, collect a buccal swab specimen for rRT-PCR and a serum specimen for IgM detection, regardless of days since symptom onset. A: Failure to detect mumps virus RNA by rRT-PCR in specimen from a person with clinically compatible mumps symptoms does not rule out mumps as a diagnosis. Successful detection of mumps virus depends primarily on the timing of collection and quality of the clinical sample. Vaccinated individuals may shed virus for a shorter period and might shed smaller amounts of virus, thus degradation of the sample has greater consequences for successful detection of virus. In outbreaks among two-dose vaccine recipients, mumps virus RNA was detected in specimen from 30%–71% of case-patients if the specimen were collected within 3 days following onset of parotitis. IgM was detected in 13 to 50% of these cases (Bitsko et al, 2008, Rota et al. 2009, Rota et al, 2013). A: A positive rRT-PCR signal indicates the presence of mumps virus RNA in the patient sample. A positive rRT-PCR result provides laboratory confirmation of mumps infection in persons with symptoms consistent with mumps. A: Successful detection of mumps virus or anti-mumps IgM antibody is dependent upon the timing of specimen collection and quality of the clinical sample. Vaccinated individuals may shed virus for a shorter period and may shed smaller amounts of virus. Viral RNA may not be detectable in specimen that have been collected, stored or shipped improperly. IgM may be transient or absent and therefore not detected. A: Mumps strains are assigned to 1 of 12 genotypes based on the sequences of the gene coding for the short hydrophobic (SH) protein. In some circumstances, a genotype has been associated with endemic circulation of mumps virus in a country; however, routine genotype surveillance for mumps is limited to only a few countries. The genetic information from circulating mumps viruses is used to track the transmission pathways of the virus and can be used to suggest epidemiologic links, or lack thereof, between cases and outbreaks. A: Since CDC initiated routine genotype surveillance for mumps in 2006, CDC and reference centers have detected mostly genotype G among people with mumps in the United States. A few of the other 11 genotypes were also detected, but they are usually associated with mumps importations into the United States and have not been associated with large outbreaks. Mumps outbreaks are typically associated with only one genotype. There are no differences in the genotypes detected in vaccinated and unvaccinated people who have gotten mumps in the United States. For more information, please see the “Genetic characterization of mumps viruses associated with the resurgence of mumps in the United States: 2015-2017external icon” study. A: Viruses like mumps have very high rates of genetic change compared to other organisms. The CDC diagnostic assay, rRT-PCR, is designed to detect a specific sequence that is conserved in many mumps genotypes. If genetic changes occur in the sequence that is being detected by rRT-PCR, the assay may lose the ability to detect mumps virus with high sensitivity. CDC monitors the performance of the RT-PCR assay in collaboration with the four Vaccine Preventable Disease Reference Centers that are supported by the Association of Public Health Laboratories (APHL) and CDC. In addition, state laboratories performing the rRT-PCR assay to detect mumps may participate in a proficiency testing program that was developed by CDC and the Reference Centers and is managed by the Wisconsin State Laboratory of Hygiene. A: Not all genetic changes result in a change in viral proteins. “Silent mutations” change the genetic sequence without changing the predicted protein. Viral proteins are recognized by the host’s immune system. There are several viral proteins, each containing many recognition sites. Therefore, it would take many genetic changes to change the viral proteins to the extent that they are no longer recognized by the immune response in vaccinated individuals. CDC is developing tests to monitor the ability of serum from vaccinated individuals to neutralize currently circulating strains. A: Laboratories are encouraged to send patient specimen from positive sporadic cases of mumps as well as representative specimen from an outbreak. The sequence of the mumps short hydrophobic (SH) gene is used to assign mumps viruses to one of 12 recognized genotypes. The sequence information may help to identify the source of the virus and can provide confirmation of suspected epidemiologic links. Specimen for genotyping can be sent to the CDC or the VPD-RCs. During ongoing outbreaks, it is not necessary to obtain a genotype on every rRT-PCR positive specimen although it is recommended to obtain representative sequences on a weekly basis. However, if the outbreak spreads to another community, an effort should be made to obtain a genotype for specimens from the new outbreak. Additionally, specimens should be submitted for genotyping from confirmed cases that do not meet the case definition, that have an unusually long incubation period, or have travel history (domestic or international). A: CDC can provide a sample of synthetic RNA for real-time RT-PCR reactions (N gene) and for genotyping (endpoint) RT-PCR (SH gene). This material is ready to use in RT-PCR reactions. If laboratories would like to produce their own RNA specimen or require a positive control for virus isolation, viruses can be obtained from ATCCexternal icon or BEIexternal icon. Public health laboratories or laboratories affiliated with state public health laboratories may send requests for mumps RNA to Dr. Bettina Bankamp. A proficiency test for mumps RT-PCR can be obtained from the Wisconsin State Laboratory of Hygieneexternal icon. References Bitsko RH, Cortese MM, Dayan GH, Rota PA, Lowe L, Iversen SC, Bellini WJ. 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