

Learning Objectives

After completing this chapter, you will be able to:

- ✓ **L01** Discuss the basic chemistry of nail salon products.
- ✓ **L02** Explain adhesion and how adhesives work.
- ✓ **L03** Identify the two main categories of nail coatings.
- ✓ **L04** Describe the basic chemistry of all nail enhancements.
- ✓ **L05** Describe the overexposure principle and its application to nail care products.

Key Terms

Page number indicates where in the chapter the term is used.

acrylates / 195	corrosive / 189	monomers / 193	polymerization / 193
acrylics / 195	cross-linker / 194	nail primer / 189	polymers / 193
adhesion / 189	cyanoacrylates / 195	oligomer / 194	simple polymer chains / 194
adhesive / 189	evaporate / 188	overexposure / 197	thermal initiators / 194
catalyst / 194	gas / 188	overfiling / 190	UV stabilizers / 196
chemical / 188	methacrylates / 195	photoinitiators / 194	
coatings / 192	methyl methacrylate monomer (MMA) / 195	plasticizers / 196	




11 Nail Product Chemistry Simplified

Chapter Outline

- Why Study Nail Product Chemistry?
- Understanding Chemicals
- Adhesion, Adhesives, and Primers
- A Clean Start
- Fingernail Coatings
- The Overexposure Principle



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Almost everything you do depends on chemistry. And with a little chemical product knowledge, you can troubleshoot and solve common salon problems that may cause service breakdowns and problem nails for your clients. Chemical knowledge is the key to becoming a great nail professional. Even if you just want to “do nails,” your success depends on having an understanding of chemicals and chemistry.

It is incorrect to think that all chemicals are dangerous or toxic substances. Educating your client not only makes your job easier, but it definitely helps increase your sales tactics. You will also boost your credibility as a professional who keeps up-to-date with industry issues.

WHY STUDY NAIL PRODUCT CHEMISTRY?

Nail technicians should have a thorough understanding of chemicals and chemistry because:

- ▶ You will be better equipped to solve problems when things go wrong.
- ▶ You will have a deeper understanding about how professional products work.
- ▶ You are less likely to be fooled by improper claims and advertising.

■ UNDERSTANDING CHEMICALS

It is incorrect to think that all chemicals are dangerous or toxic substances. The vast majority of chemicals that you will come in contact with during your lifetime are completely safe; most are beneficial. That is because everything around you is made of chemicals. The walls, this book, food, vitamins, even oxygen and water are chemicals. In fact, everything you can see or touch, except light and electricity, is a **chemical**. Most chemicals are found as molecules. Molecules are like tiny building blocks. They can be arranged and rearranged into an unlimited number of combinations. Petroleum oil can be chemically converted into vitamin C. Acetone can be changed into water or oxygen. Paper can be made into sugar. The possibilities are endless. In medieval times, alchemists searched in vain for ways to turn lead into gold. Today, it is possible to do so, but the process costs more than the value of the gold.

Vapors and Gases

Most people are very familiar with the definitions of solid and liquid. It is easy to see that something liquid is not a solid. However, since people cannot easily see the differences between a **gas** and a vapor, these terms are often confused. There is a very important difference between these two terms. (Bear in mind that all professions have a specific set of terms practitioners must be familiar with. So as a nail professional, you should always strive to use the proper terminology.)

Gases are very different from vapors. Vapors are formed when liquids **evaporate** into the air. Any substance that is liquid at room temperature will form a vapor. The higher the temperature, the faster the vapor will form. A vapor will turn back into a liquid if it is cooled again. Water, alcohol, and acetone form vapors. All types of nail enhancement systems will form vapors. Monomer

liquids (even odorless monomer), UV gels, wrap resins, and adhesives all form vapors—not gases or fumes.

Fumes are a blend of soot-like particles mixed with vapors. They usually result from burning substances, such as candles, incense, cigarettes, and gasoline in a car engine. They must not be confused with vapors, which are described above. It would be incorrect to use the term “fume” when speaking about a vapor or gas. Obviously, there is a big difference between water vapor and cigarette fumes (smoke). Nail monomers emit vapors, not fumes. **LO1**

■ ADHESION, ADHESIVES, AND PRIMERS

Adhesion

Adhesion is a force of nature that makes two surfaces stick together. Adhesion results when the molecules on one surface are attracted to the molecules on another surface. Paste sticks to paper because its molecules are attracted to paper molecules. Oils, waxes, and soil will contaminate a surface and block adhesion. This is why a clean, dry surface will provide better adhesion.

Adhesives

An **adhesive** is a chemical that causes two surfaces to stick together. Adhesives allow incompatible surfaces to be joined. Scotch® tape is a plastic that is coated with a sticky adhesive. Without the adhesive, the plastic film would not stick to paper. The sticky adhesive layer acts as a “go-between” and holds the tape to the paper. Adhesives are like a ship’s anchor. One end of the anchor is attached to the ship, and the other end attaches to the ground.

There are many types of adhesives. Different adhesives are compatible with different surfaces.

Nail Primer

A **nail primer** is a substance that improves adhesion. A nail polish base coat is a type of primer. Why? Because the base coat makes the nail polish adhere better. A base coat acts as the “go-between” or “anchor.” It improves adhesion.

Other types of primers are sometimes required with nail enhancements. There are three basic types: acid-based, nonacid, and acid-free. These are especially useful if the client has oily nail plates, where adhesion is a problem. Some types of nail primers act like double-sided sticky tape (**Figure 11-1**). One side sticks well to the nail enhancement and the other side holds tightly to the nail plate. These types of primers create physical bonds. Newer types of primers chemically bond with the enhancement and the nail plate to create a chemical linkage. A common misconception is that nail primers “eat” or “etch” the nail. This is completely false!

Nail clippings can soak for many years in any primer without dissolving. Still, nail primers are for professional use and must be used with caution. Some are very corrosive to soft tissue and eyes. A **corrosive** is a substance that can cause

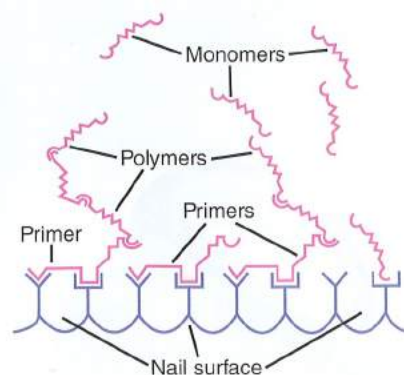


Figure 11-1 Many primers act as “double-sided sticky tape” to anchor monomers firmly to the surface of the natural nail plate.

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visible and possibly irreversible permanent skin or eye damage. Nail primers, like most professional nail products, must never touch the skin! Acid-based primers are corrosive and can cause painful burns and scars to soft tissue and eyes. This is why corrosive primers must be kept in containers with child-resistant caps, and safety glasses should be worn when these products are in use.

Even though primers will not damage or etch the nail plate, corrosive acid-based primers can burn the nail bed tissue if the nail plate is improperly filed. Overfiling the natural nail will excessively thin the nail, making it more porous. If too much primer is used, the nail plate may become overly saturated and tiny amounts may reach the nail bed, potentially leading to the separation of the nail plate from the bed. Use primer sparingly! One very thin coat is enough for most clients. If you find that you rely on two or more coats to prevent lifting, something is wrong! Check your nail preparation and application procedure for problems. Primer can become a crutch, covering up improper application or inadequate nail plate preparation. In the long run, it is better to get to the root of the problem and improve your technique rather than rely on excessive amounts of primer.

Not all primers are corrosive to skin. Noncorrosive primers, sometimes called nonacid or acid-free primers, do not contain methacrylic acid, the acid-base primer ingredient. Nonacid primers may actually contain other types of acidic substances, while acid-free primers contain no acids and have a neutral pH. Both types are noncorrosive to skin and, therefore, will prevent burning of the soft tissue. They must be used with caution and skin contact must be avoided (**Figure 11-2**). Prolonged and repeated skin contact caused by improper application can lead to an allergic reaction over time. If you never bring the product into contact with the skin, it is extremely unlikely that the client will become allergic to the product. Product vapors do not cause skin allergies. These types of allergies are caused by repeated product skin contact. Thus, it is best to avoid all contact between nail enhancement products and soft tissues.

■ A CLEAN START

Good adhesion depends on proper technique and high-quality products. The best way to ensure success is to start with a clean, dry surface. Washing the hands and scrubbing the nail plate removes surface oils and contaminants that interfere with proper adhesion. Scrubbing also gets rid of the bacteria and fungi that cause fingernail infections. Skipping this important step is a major contributor to fingernail infections and can lead to product lifting, mainly at the base of the nail plate near the eponychium. Improper nail preparation is a leading cause of most types of nail enhancement product lifting.

A nail dehydrator temporarily removes surface moisture from the nail plate. Excessive moisture on the surface of the plate can interfere with product adhesion, just as surface oils can. Nail dehydrators remove traces of both moisture and oil. But, within 30 minutes, the normal natural oils and moisture will return to the nail plate. How is that information useful? It should suggest that for problem lifters, it might help to dehydrate only one hand at a time, very thoroughly, and after a good scrubbing.

It is a myth that nail enhancements and tips do not stick unless you “rough up the nail.” This is absolutely false and potentially harmful to clients’ nails.

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▲ **Figure 11-2** Avoid contact with the skin when using nail primers, adhesives, wraps, monomer liquids, polymer powders, and UV gels.

Adhesion is best when the nail plate is clean and dry. Use only a medium/fine (240 grit) abrasive or buffer to remove only the surface shine. Avoid using heavy-grit abrasives, heavy-handed filing (too much downward pressure), and improper use of electric files. These can strip away the layers of the natural nail plate. The thinner the nail plate, the weaker it will be. This is not what your

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clients pay for when they come to you for service. Thinner nail plates create a weaker foundation for nail enhancements. The thicker the nail plate, the better the foundation will be for these types of services. In other words, your clients will have better success wearing nail enhancements if you do not overfile the nail plate! This is extremely important to remember. How you treat the natural nail when applying nail enhancements can make or break your professional nail career. So, read the following section very carefully. Keeping the nail plate thick, strong, and healthy is the nail professional's first duty!

When nail enhancements are removed, clients are likely to see damage caused by heavy filing. They mistakenly blame primers and nail enhancements for what they see. Rough filing damages both the nail plate and the underlying sensitive tissues of the nail bed. Do not be a nail professional who does this to customers or you might not be a nail professional for very long! Also, heavy abrasives and **overfiling**, excessively roughing up the nail plate, may cause the nail plate to lift and separate from the nail bed. Overfiling may cause potentially dangerous, excessive thinning of the nail plate. Once this occurs, clients are more susceptible to developing infections under the nail plate. It must be avoided at all costs.

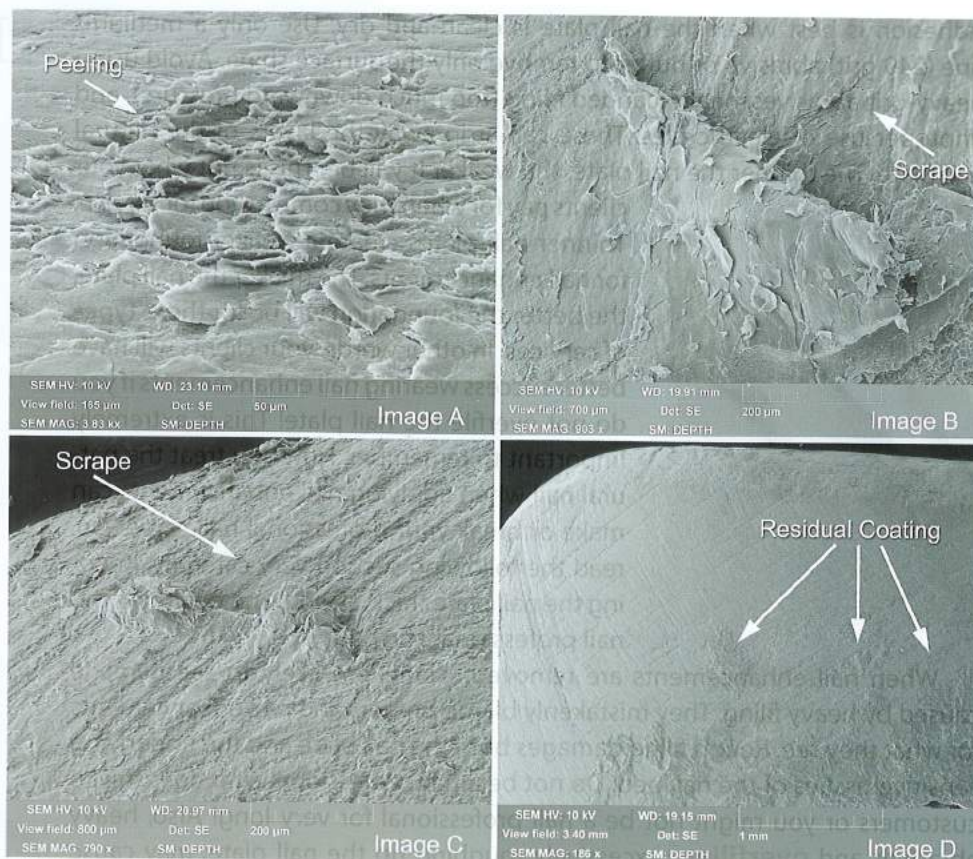
Overfiling the nail plate causes more problems for nail professionals than you might realize. Overfiling is one of the leading causes of nail enhancement service breakdown. It can lead to lifting, breaking, free-edge chipping, and free-edge product separation or "curling." It also can promote allergic reactions and may cause painful friction burns to the soft tissue of the nail bed.

If you feel that you need to rough up the nail plate to get good adhesion, then something is wrong! Many nail professionals have great success without roughing up the nail plate. Why? The answer is simple: They properly spend more time and attention preparing the nail plates by removing all dead tissue from the side walls and cuticle area as well as bacteria, fungi, oil, and moisture from the nail plate. They use correct application techniques and high-quality professional products. Lifting problems can usually be traced back to one of those key areas, and usually most of these problems are caused by improper nail preparation.

Some of the newer UV gel manicure products are designed to be removed more easily and frequently, but even these must be removed with caution. Soaking the nail plate in any liquid, including water or acetone, will temporarily soften the nail plate's surface for up to 60 minutes. The use of metal or wooden pushers to scrape or pry away residual products can lead to pitting and gouging of the nail surface. When several of these microscopic pits or gouges occur in a small area, the surface is roughened and can appear as whitish spots on

Did You Know?

Nail enhancements are not designed to be taken off frequently (more than twice per year). Product removal is the most potentially damaging service that can be performed. Even when done carefully, complete removal can damage and dry the nail plate. It is best to leave the enhancements in place and only remove them when clients no longer want to wear them. Even removing them three or four times a year can be damaging. It is better for the nail tech to leave them in place and keep them properly maintained.



▲ **Figure 11-3** All nail coatings must be removed carefully, since improper removal may seriously damage the nail. This nail damage was created when UV nail coatings were forcibly scraped from the nail plate with a wooden pusher stick.

the nail. When these spots are highly magnified, as shown in **Figure 11-3**, the causes become obvious. Image A shows how nail cells are pulled away from the surface when a small piece of residual coating is pried from the nail plate. Images B and C show the effects of a wooden implement used to scrape off residual products. Image D is magnified 150 times to show residual product left on the nail plate. Imagine how much more damage could be created with a metal implement. Whenever removing any type of coating from the nail plate, heavy-handed scraping or filing must be avoided in order to protect the client's nails from excessive damage. If the coating is not completely removed after exposure to remover solvents, more time should be allowed for the remover to properly soften the coating so that it can be gently removed without damage. It is the nail technician's professional responsibility to avoid nail damage and to properly remove nail coatings. **LO2**

■ FINGERNAIL COATINGS

As a nail professional, you must perform many tasks. The most important of these is to apply coatings to the nail plate. **Coatings** are products that cover the nail plate with a hardened film. Examples of typical coatings are



nail polish, top coats, nail enhancements, and adhesives. The two main types of coatings include:

- Coatings that cure or polymerize (chemical reaction)
- Coatings that harden upon evaporation (physical reaction)

Nail enhancements and UV gel manicures are examples of coatings created by chemical reactions. Nail polish, base- and top coats are examples of coatings created by evaporation.

The following is a brief overview of the chemistry behind these products.

Monomers and Polymers

Creating a nail enhancement is a good example of a chemical reaction. Trillions of molecules must react to make just one sculptured nail. Durable and long-lasting coatings or nail enhancements are all created by chemical reactions. All monomer liquid and polymer powder nail enhancements, UV gels, wraps, and adhesives work in this fashion.

The molecules in the product join together in extremely long chains, with each chain containing millions of molecules. These gigantic chains of molecules are called **polymers** (POL-uh-murs). Polymers can be liquids, but they are usually solid. The chemical reaction that makes polymers is called **polymerization** (puh-lim-uh-ruh-ZAY-shun). Sometimes the terms cure, curing, or hardening are used, but they all have the same meaning.

There are many different types of polymers. Teflon®, nylon, hair, and wood are polymers. Proteins are also polymers. Nail plates are made of many proteins, including keratin. So, nail plates and hair are also made from polymers.

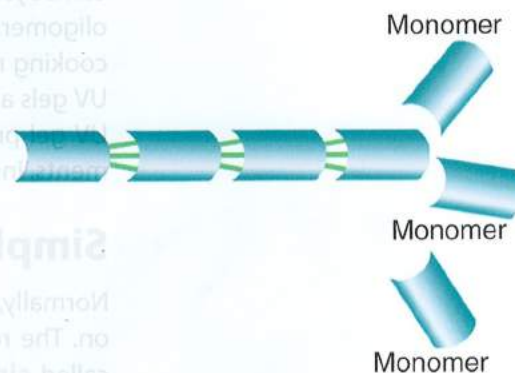
The individual molecules that join to make the polymer are called **monomers** (MON-uh-murs). In other words, monomers are the molecules that make up polymers. For example, amino acids are monomers that join together to make a polymer that is commonly called keratin (Figure 11-4). **LO3**

Understanding Polymerization

If you understand the simple basics of polymerization, you will be able to prevent many common salon problems. Monomer liquid, polymer powder nail enhancements, and UV gels and wraps all seem very different, but they are actually quite similar. Each type of product is made from a different but closely related monomer. Monomers are like track runners milling about at the starting line, patiently waiting for the race to begin. The race starts when the proper signal is given. Once given, the runners do not stop until they cross the finish line.

The same is true for monomer molecules. They are like the runners, waiting for something to trigger polymerization. This is done by a special ingredient called an initiator. Initiator molecules energize! They carry extra energy. Each time an initiator touches a monomer, the initiator excites it with a boost of energy. But the monomer molecules do not like the extra energy and try to get rid of it. They do this by attaching themselves to the tail end of another monomer and passing the energy along. The second monomer uses the same trick to get rid of the energy.

As this game of tag continues, the chain of monomers gets longer and longer. A billion monomers can join in less than a second! Soon, the many growing monomer chains begin to get in each other's way. They become tangled



▲ **Figure 11-4** A simple polymer chain grows by adding monomers in a head-to-tail fashion.

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and knotted, which explains why the product starts to thicken. Eventually, the chains are much too long and crowded to freely move around. The product has become a teeming mass of microscopic-sized strings. When this occurs, the surface is hard enough to file, but it will be several days before the chains reach their ultimate lengths. This explains why all nail enhancements become stronger during the first 48 hours. Initiators get the extra energy they pass on from either heat or light. Liquid and powder systems use **thermal initiators** that gather energy from the heat of the room or hand; UV curing products use **photoinitiators** that derive their extra energy when exposed to UV.

A **catalyst** is a substance that speeds up a chemical reaction by making initiators work more efficiently or by helping chemical reactions happen more easily. Catalysts are found in every type of nail enhancement product and are the reason why nail enhancements harden so quickly.

An **oligomer** is a short chain of monomers that has had the growth of its chain halted before it became a polymer. Oligomers are useful because they can be joined quickly and easily into long chains to create polymers. In a sense, oligomers are like microwave dinners that are partially cooked so that they finish cooking more quickly in your kitchen. Oligomers are important ingredients in UV gels and are what give the gels their sticky consistency. Without oligomers, UV gel products might take two or three hours to harden into nail enhancements, instead of two or three minutes.

Simple Versus Cross-Linking Polymer Chains

Normally, the head of one monomer reacts with the tail of another, and so on. The result is a long chain of monomers attached head to tail. These are called **simple polymer chains**. Wraps and tip adhesives form this type of polymer. In these polymers, the tangled chains are easily unraveled by solvents, which helps explain why they are easily removed. Polymer chains can also be unraveled by force. Products with simple polymer chains are easily damaged by sharp impacts or heavy stresses. Dyes and stains can also get lodged between the tangled chains. Nail polishes, marker ink, foods, and many other things may cause unsightly stains on the surface.

To overcome these problems, UV gels and monomer liquid and polymer powder nail enhancements use small amounts of special monomers called cross-linkers. A **cross-linker** is a monomer that joins different polymer chains together. These cross-links are like rungs on a ladder. Cross-links create strong net-like polymers. The result is a single three-dimensional structure of great strength and flexibility known as a nail enhancement.

Activity

Polymers are everywhere in nature: hair, nails, even wood. Use the Internet or your local library and find five other useful, naturally occurring polymers not mentioned in the book. You should be able to find five easily. There are many thousands of examples! Explain how the five that you found are useful.

Nail plates and hair also contain cross-links, which make them tough, durable, and resilient. Besides increasing the strength of both natural nails and nail enhancements, cross-links make them more resistant to staining. Cross-links are also more resistant to solvents, including water and acetone. This explains why cross-linked nail enhancements take longer to remove in acetone than products that are not cross-linked—such as wraps and tip adhesives—and why they are more resistant to the effects of water.

The differences between the various types of nail enhancement products are not as great as you might imagine. All nail enhancements and adhesives are based on a family of chemical ingredients called the **acrylics**. Yes, all of them are acrylics, even though most nail professionals use this term only in reference to monomer liquid and polymer powder systems. There are three main types of acrylics used to make all nail enhancements and glues. They are:

- Methacrylates
- Acrylates
- Cyanoacrylates

Methacrylates are used to make all monomer liquid and polymer powder systems and at least one type of UV gel. All other UV gels are based on another type of acrylic called **acrylates**. All nail adhesives (glues) and wraps are based on **cyanoacrylates**. Even though these three types of acrylics are closely related, they are different enough to create the unique properties that make these types of products useful to nail technicians. In other words, their physical properties may be very different, but the chemistry behind nail enhancement products and adhesives is very similar. **LO4**

Methyl methacrylate monomer (MMA) is a substance with continued use in some nail salons despite both U.S. and international prohibitions and bans. Many nail technicians do not understand why they should not use MMA and wrongly believe that “toxicity” is the reason. This is untrue. When properly used, MMA is a safe substance that is widely used around the world for many applications. MMA is the preferred bone repair cement for implantation into the body. MMA is not a carcinogen, is not absorbed into the blood to affect health, does not cause brain tumors, and is not dangerous to inhale in a salon environment that has proper ventilation. There are four main reasons that MMA monomer makes a poor ingredient for nail enhancement products and should never be used:

- MMA nail products do not adhere well to the nail plate without shredding the surface of the nail plate with a coarse abrasive or electric file. Excessively thinning the nail plate will make it become weaker.
- MMA creates nails that are rigid and difficult to break. When jammed or caught, the overly filed or thinned natural nail plate will often break instead of the MMA enhancement. This can cause serious nail damage.
- MMA is extremely difficult to remove and will not dissolve in product removers. It is often pried off, creating still more damage. Since MMA products tend to discolor and become brittle more quickly than traditional products, they must be removed more often. The difficult removal process often causes a lot of nail damage.
- The FDA and most state boards of cosmetology say not to use it! This is the most important reason. The FDA bases its prohibition on the large number of consumer complaints resulting from the use of MMA nail enhancements in the late 1970s. It continues to maintain this position today.

Did You Know?

Methacrylates and cyanoacrylates used in the nail industry are in the “monomer” form, while acrylates are usually used as “oligomers.” This explains why UV gels are usually thicker and stickier in consistency than powder and liquid overlays.

Did You Know?

Two common myths are that some UV gel nail enhancement products are made from sugar and that some types of polymer powders are edible. Both are false marketing claims. All UV gels are made from oligomers, not sugar. And no nail enhancement products are edible. They are cosmetics, not food, and it is illegal and inappropriate to market them in this fashion.

Evaporation Coatings

Nail polishes, top coats, and base coats also form coatings. However, these products are entirely different. They do not polymerize or cure. No chemical reactions occur, and they contain no monomers or oligomers. These products all work strictly by evaporation. The majority of the ingredients are volatile or quickly evaporating solvents. Special polymers are dissolved in these solvents. These polymers are not cross-linked polymers, so they dissolve easily. As the solvents evaporate, they leave behind a smooth polymer film. This film can hold pigments, which give it color. Artist paints and hair sprays work in the same fashion. These types of products also contain ingredients called **plasticizers**, which are used to keep the products flexible, and **UV stabilizers**, which control color stability and prevent sunlight from causing fading or discoloration. These types of ingredients are also found in nail enhancement products, where they serve the same function. Of course, the strength of non-cross-linked polymers is much lower than cross-linked nail enhancement polymers. This is why polishes are prone to chipping and are so easily dissolved by removers. Now you can see for yourself the great difference between coatings that cure or polymerize and those that harden upon evaporation.

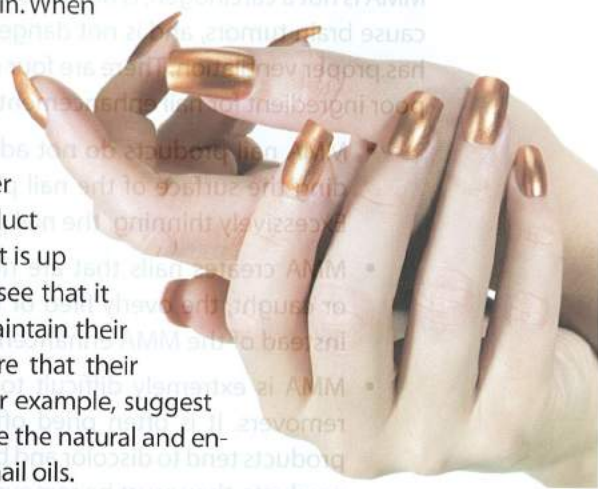
"Better for the Nail" Claims

Some believe that certain types of nail enhancement products are "better" for the natural nail. Or that some are natural or organic and that others are not. This is absolutely false! These are claims designed to fool nail technicians. All nail enhancements are made from organic substances. No one type of nail enhancement product is better for the nail plate than another.

What is better for the nail? That is easy to answer. The best thing for the natural nail is a highly skilled, educated, and conscientious nail professional. She is the natural nail's best friend. Good nail professionals protect the health of the nail plate and prevent natural nail damage and infection. The job of every nail professional is to nurture the nail plate and surrounding skin. When problems occur, they are usually caused by improper nail plate preparation, improper application or maintenance, or improper removal. It is wise to educate yourself about the products you are using and their proper application. Any nail enhancement product can be applied, worn, and removed safely. It is up to you to use your knowledge and skill to see that it happens. Teach your clients to routinely maintain their nail enhancements in order to help ensure that their nails will always be in perfect condition. For example, suggest professional products designed to penetrate the natural and enhanced nail to keep it flexible: penetrating nail oils.

Protect Yourself

Take extreme care to keep brush handles, containers, and tabletops clean and free from product dusts and residues. Repeatedly handling these items will cause



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overexposure if the items are not kept clean. Nail enhancement products are not designed for skin contact! If you avoid contact, neither you nor your client will ever develop an allergic reaction. Many serious problems can be related to contact dermatitis. Do not fall into the trap of developing bad habits.

■ THE OVEREXPOSURE PRINCIPLE

People usually think of toxic substances as dangerous poisons. You may hear the term “toxic” often, but should nail professionals try to avoid products that are toxic? The answer to this question may surprise you.

Paracelsus, a famous sixteenth-century physician, was the first to talk about poisons and toxins in a scientific way. What he said was so profound that scientists to this day quote him regularly. He said, “All substances are poisons; there is none that is not a poison. Only the dose differentiates a poison and a remedy.” Paracelsus was right. He was the first to recognize that everything on Earth is toxic to some degree. There is nothing in the world that is completely nontoxic. In fact, the word “nontoxic” is a made-up marketing term that has no precise scientific meaning.

To understand how to safely use and handle your products, review the manufacturer’s Safety Data Sheets or SDS (formally called MSDS) for important safety information that will help you protect yourself and your clients.

The *overexposure principle* is the modern-day expression of what Paracelsus learned. This important principle says that **overexposure** determines toxicity.

The next time someone tells you that a product is “nontoxic,” think about what you have learned. Salt water is very toxic to drink. Still, you can safely swim in the ocean without fear of poisoning. Rubbing alcohol is also quite toxic. A tablespoonful could poison and kill a small child, but it is safe to use if kept out of reach of children. Toxicity does not make a substance automatically unsafe; instead it means that you must learn how to use it in a safe manner.

Preventing Inhalation Overexposure

An important problem in the salon industry is the lack of proper ventilation. When a new salon takes over an existing space that was previously occupied by another business (such as a travel agency), it makes sense that additional ventilation will be required. A salon’s ventilation requirements are likely to significantly exceed the needs of other types of businesses. In other words, the existing ventilation in a retail space is not likely to be adequate for a nail salon.

Proper ventilation is an important requirement that must not be ignored. Ensuring that the salon has proper ventilation is a federal OSHA mandate that all salon owners and workers should take seriously. The OSHA Hazard Communication Standard requires that all salons have proper ventilation. What is “proper” ventilation? For salons, this means ventilation that is adequate for the type of work being performed and sufficient to protect nail technicians from becoming overexposed to vapors and dusts. Besides ensuring that the existing building ventilation is properly maintained and in good working order, nail salons generally require additional ventilation such as is provided by local source capture ventilation systems (**Figure 11-5**). These systems are designed to capture vapors and dusts at the source and remove them from the air before

CAUTION:

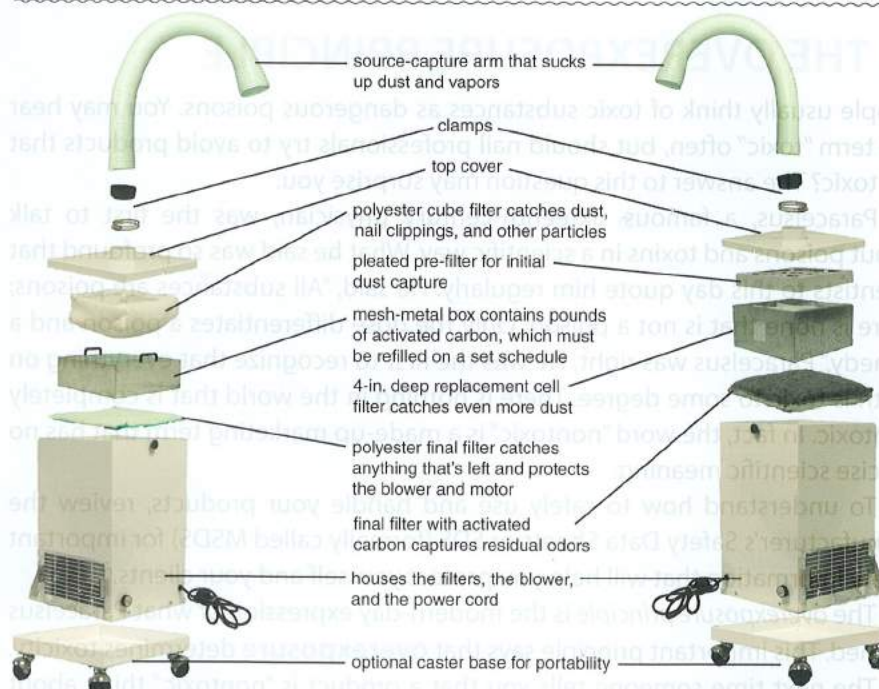
During the removal process of some nail enhancement products, your client’s fingertips must soak in acetone. Place a clean terry cloth towel over the container. This helps to slow evaporation and minimize the acetone vapors in the salon air. Acetone is frequently used to remove nail polish and to dissolve nail enhancements and other coatings. It is one of the safest solvents used in nail salons. When used as a polish remover, acetone dissolves old polish (the solute). Acetone works quickly because it is a good solvent for artificial nail products. However, it is highly flammable and must be used with appropriate caution. It should always be kept away from excessive heat, open flames, sparks, or other sources of ignitions.



▲ **Figure 11-5** The best way to control dust in the salon is with a professional source capture ventilation system designed to collect and remove dust particles from the air or to ventilate them to the outdoors.

INSIDE A SOURCE-CAPTURE VENTILATION SYSTEM

A source-capture system at your station is your first line of protection. Using the Salon Pure Air's Spa 1 (left) and Spa 2 (right) systems as examples, here are the typical components. On the left is a system for salons that primarily do **acrylics** or **natural nails**. On the right is a system for salons that primarily do **UV gels**:



▲ **Figure 11-6** The ventilation system should have an activated carbon filter that is a minimum of 3" thick for absorption of vapors.

they have a chance to escape into the salon. When properly maintained and used, local source capture ventilation systems are one of the most effective ways to help ensure safe working conditions. The ventilation system should have a prefilter that captures dusts and an activated carbon filter that is 3" thick for absorption of vapors (**Figure 11-6**). Systems with less than a 3" thick bed of activated carbon cannot properly absorb vapors nor can they remove them from the salon air. Many types of local exhaust systems are mobile and can be easily transported from one station to another, if needed. These devices capture vapors and dusts at their source, which is why they are more effective than home- and office-style air cleaners.

Fans and open windows are not substitutes for proper ventilation or local exhaust ventilation: they will simply circulate vapors and dust around the room. These do not protect the breathing zone, which is an invisible 2-foot sphere around the nail technician's head/face. Since every breath of air comes from the breathing zone, it is important to use ventilation to prevent vapors and dusts from entering this zone. These systems work great for capturing all types of vapors and the finest dusts in the salon and keeping them out of the breathing zone. Local source capture systems are very effective and will help prevent overexposure if the manufacturer's recommendations are followed and the system is properly maintained. Salon services should not be provided if proper and adequate ventilation is not available. A supply of fresh, clean breathing air

Courtesy of Salon Pure Air and Nails Magazine.

is important to good health. A salon room air purifier designed specifically to remove nail vapors and dusts is also recommended. Make sure to purchase a professional system designed for heavy-duty use, not one designed primarily for residential use. Air cleaners designed for use in the home or bedroom are not sufficient for salons and will not provide adequate protection.

Masks

Inhalation of dusts can be greatly reduced by wearing a high-quality, properly fitted dust mask (**Figure 11-7**). The mask can filter out most of the dusts from your breathing air. Properly fitted dust masks rated N-95 are highly effective and a great choice for preventing inhalation overexposure to dusts. They are vastly superior to the flimsy surgical-type masks, which are ineffective for dusts and should not be worn in salons. Choose a mask designed specifically for dusts, mists, or molds to ensure the mask will be effective in the salon setting. It is important to note that these types of masks are not effective against vapors and should never be used in place of proper ventilation. Dust masks should be thought of as a supplement to a good ventilation system, since they can block dust particles from entering the mouth and nose. **LO5**



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▲ **Figure 11-7** Inhalation of dusts can be greatly reduced by wearing a high-quality, properly fitted N-95 dust mask.

BUSINESS TIP

All the services that you perform provide the perfect opportunity to sell nail care products to your clients. For example, if the client comments that the lotion you are using during a hand massage feels good, selling it should be easy—just explain the lotion's important features and benefits and then ask if the client would like some for home use. Even if the client seems uninterested in the products that you are using, you can still sell other items.

Talk to your clients about the benefits of the products you are applying to their nails, hands, or feet. You may say something like: "This is our latest high-shine top coat" or "This penetrating nail oil would be very beneficial for your brittle nail plates." Feature the products you use while performing the service. At the end of the manicure, place the item in the client's hand and ask if you can add it to her or his ticket. This last step is crucial to close the sale. If you make a recommendation early in the appointment, but do not pursue it at the end, the client often forgets about it.

Review Questions

1. Can primers eat the nail plate? Explain your answer.
2. Define monomers.
3. What is one possible cause for an allergic reaction?
4. Give four reasons why MMA products should not be used in the nail salon.
5. ____ and/or ____ skin contact can cause a client to become allergic to products.
6. In your own words, explain what Paracelsus discovered about toxic substances. How can you use this knowledge to work safely?
7. To which family of ingredients do all UV gels, monomer liquid, and polymer powder systems, wraps, and adhesives belong?



Figure 11-7: Inhalation of dust can be prevented by wearing a high-quality, properly fitted N-95 dust mask.

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